Nutrition Society of India

XXXIV Annual Meeting / Conference

Scientific Programme and Abstracts

December 5th-6th, 2001

CIAE, NABIBAGH,
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NUTRITION SOCIETY OF INDIA

XXXIV Annual Meeting / Conference

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Scientific Programme and Abstracts

December 5th - 6th, 2001

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XXXIV Annual Meeting & Conference

NUTRITION SOCIETY OF INDIA

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Cardiovascular Diseases and Nutrition Dr. Yogesh Verma, Head of the Deptt. of Cardiology, GMC, Bhopal	
Cancer & Nutrition Dr. Uma Devi, Head of the Deptt., Cancer Reasrach, Jawaharlal Nehru Cancer Hospital & Research Centre, Bhopal	
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Role of traditional medicine in Women's health Dr. Shailja Chandra, Deptt. of Indian Systems of Medicine & Homoeopathy, Ministry of Health & Family Welfare, New Delhi	
AIDS & Nutrition Dr. Ashok Sharma, Additional Director, AIDS Control, MP State AIDS Control Society, Deptt. of Public & Family Welfare, Govt. of M.P., Bhopal.	
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NUTRITION SOCIETY OF INDIA

34th Annual Meeting

5-6 December 2001

PRESIDENTIAL ADDRESS

B. S. Narasinga Rao

In my Presidential Address during the previous two annual meetings of NSI, I had dwelt upon the future course of development of Nutrition Science and Nutrition Research in India and emphasized the need or the application of the new frontier areas of science, like genetics and biotechnology in finding solutions to the persisting problems of malnutrition in our country. I also stressed the need for exploiting the functional foods in controlling and preventing non-communicable diseases, which are emerging as major health problems in our country.

This year, I wish to dwell upon the potential of food chemistry and food science and the application of stable isotopes in the future course of nutrition research. Food chemistry and foods analysis had an important place in nutrition research during the first half of the last century when the macro and micronutrients content of commonly consumed foods were determined. In recent years, the area of research in food chemistry is receding into background. There is a need now to revive research activities related to food analysis and food chemistry, with the application of newly developed techniques like GC, HPLC and emission and atomic absorption spectroscopy for determining the food content of a wide range of micronutrients, the essentiality of some of which considered earlier not important are being established (viz., choline in cardiovascular disease), future food analysis should also cover some of the common nutrients like carbohydrates, iron, carotene, whose content in common foods has to be reanalysed precisely by employing the newer analytical techniques. Another important area of future research in food chemistry in India is to assess the content, biopotency and bioavailability of non-nutrient phytochemicals present in a wide range of plant foods and also some of the edible unconventional foods consumed in India. This should form an ongoing research programme on functional foods in India at the National Food and Nutrition Institutions and the Departments of Food and Nutrition in the Universities.

Yet another area of future development in nutrition research is the use of stable isotopes which is now being increasingly used in place of radioactive isotopes which were used extensively earlier in nutrition research to study nutrient absorption and metabolism and which are now considered not safe for use in human studies. Considering the safety of stable isotopes, they can be used, to study the metabolism and bioavailability of nutrients in foods and their requirements among infants, women, children, pregnant and lactating women among whom radio isotopes are considered not safe to use. In view of the high cost of the stable isotope and their measuring equipment, they can be used selectively to standardize the other less expensive methods. One important area of research which has emerged during this decade (nineties) is the use of doubly labelled water (O^{18},H^2) in assessing accurately energy expenditure. Although stable isotopes can be used in many institutions and departments in their nutritional studies on human subjects, isotope measurement can be carried out at a few advanced centres which can act as service centres for measuring stable isotope concentration in samples sent from other centres. It is hoped that in the coming decade, studies in food chemistry with advanced techniques and nutrient metabolism and assessment of human requirements of nutrients using stable isotopes will receive greater emphasis.

XXXIV Anual Meetings of the
NUTRITION SOCIETY OF INDIA
Bhopal, Madhya Pradesh

SCIENTIFIC PROGRAMME

5th - 6th December, 2001

5th December, 2001

8:15 am - 9:00 am	Registration
9:00 - 10:00 am	**Inauguration**
10:00 am - 10:30 am	Tea
10:30 am - 01:00 pm	**SYMPOSIUM - I : "NUTRITION AND CHRONIC DISEASE"** **Venue** (Auditorium, CIAE)

Chairpersons : Dr. B.N. Tandon / Dr. Kamala Krishnaswamy

Rapporteur : H.P.S. Sachdev

SPEAKERS :

1. Osteoporosis
   Dr. P.K. Dave, Director, AIIMS, New Delhi

2. Nutritional factors associated with gallstones
   Dr. R. K. Tandon, Dept. of Gastroenterology, AIIMS, New Delhi

3. Cardiovascular Diseases and Nutrition
   Dr. Yogesh Verma, Head of the Deptt. of Cardiology, GMC, Bhopal

4. Cancer & Nutrition
   Dr. Uma Devi, Head of the Deptt., Cancer Reasrach,
   Jawaharlal Nehru Cancer Hospital & Research Centre, Bhopal

1:00 pm - 2:00 pm	Lunch
2:00 - 4:00 pm	**YOUNG SCIENTIST'S AWARDS** **Session - I** (Senior & Junior Award - Community Nutrition)

Chairpersons : Dr. Tara Gopaldas / Dr. Sharad Tiwari

Rapporteur : Dr. V. Kawalkar

4:00 - 5:00 pm	**TEA AND POSTER SESSION** Executive Committee Meeting. **Venue :** (Director's Conference Hall)

5:00 - 6:00 pm	**FREE COMMUNICATIONS** (Simultaneous Sessions) **Session - I** (Community Nutrition) **Venue :** (Block A, CIAE, Bhopal)		
	Chairpersons	:	Dr. Gyanendra Singh / Dr. Usha Chandrasekhar
	Rapporteur	:	Ms. Amita Singh
	Session - II (Experimental Nutrition and Others) **Venue :** (Block B, CIAE, Bhopal)		
	Chairpersons	:	Dr. R.K. Tandon / Dr. Nawab Ali
	Rapporteur	:	Dr. A.N. Radha
6:00 - 6:30 pm	High Tea		
6:30 -7:30 pm	**TWENTY FIFTH GOPALAN ORATION:** **Venue** (Auditorium, CIAE, Bhopal)		
	Speaker	:	Dr. B.S. Narasinga Rao Newer prespectives in Energy Nutrition and Malnutrition and their relevance in India
	Chairperson	:	Dr. S. Varadrajan
	Rapporeur	:	Dr. B. Sivakumar
8:00 pm	Dinner		
6th December, 2001			
8:00 am - 9:00 am	**ANNUAL GENERAL BODY MEETING / PRESENTATION OF REPORTS BY CHAPTER CONVENERS** **Venue :** (Director's Conf. Hall, CIAE, Bhopal)		
9:00 am - 10:00 am	**THIRTEENTH SRIKANTIA MEMORIAL LECTURE :** **Venue :** (Auditorium, CIAE, Bhopal)		
	Speaker	:	Dr. Prema Ramchandran Research studies on mother child dyad - Foundation for national programmes.
	Chairperson	:	Dr. Shanti Ghosh.
	Rapporteur	:	Dr. Ramesh V. Bhat
10:00 am - 10:30 am	Tea		
10:30 - 1:30 pm	**YOUNG SCIENTISTS' AWARDS** **Session - II** (Junior Award - Experimental Nutrition) **Venue :** (Auditorium, CIAE, Bhopal)		
	Chairperson	:	Dr. P. K. Dave / Dr. Mrinalini Devi Powar
	Rapporteur	:	Dr. Vijayalakshmi Purushowthamam

1:30 pm - 2:15 pm	Lunch
2:15 - 5:30 pm	**SYMPOSIUM - II "WOMAN'S ROLE IN IMPROVING NUTRITIONAL STATUS O THE COMMUNITY".** **Venue :** (Auditorium, CIAE, Bhopal)
	Chairperson : Dr. Rajammal Devadas
	Rapporteur : Dr. Umesh Kapil
Key Note Address	"Role of women in the nutrition of child the Cehrnobyl Experience" By Dr. Elemora K. Kapitonova, Ul Pushkina, 34-11, 246000 Gomel, Bealrus.

CHAIRPERSON : Dr. Tara Gopaldas.

1. Impact of women as health entrepreneurs on the nutrition and community
   Dr. M.S. Bamji, Dangoria Hospital, Hyderabad

2. Women's role in agriculture and horticulture development
   Dr. Gyanendra singh, Director, CIAE, Bhopal

CHAIRPERSON : Dr. Swarna Bisarya Gupta

3. Role of traditional medicine in Women's health
   Dr. Shailja Chandra, Deptt. of Indian Systems of Medicine & Hcmoeopathy,
   Ministry of Health & Family Welfare, New Delhi

4. AIDS & Nutrition
   Dr. Ashok Sharma, Additional Director, AIDS Control, MP State AIDS Control Society,
   Deptt. of Public & Family Welfare, Govt. of M.P., Bhopal.

5. Changing Trends in Nutritional Dissorders
   Dr. Savita Inaamdar, Chairperson, MP State Women Commission, Indore

5:30 - 6:00 pm	Tea
6:00 pm - 6:30 pm	**REVIEW OF POSTER SESSION**
	Speaker : Dr. Kamala Krishnaswamy
7:00 pm	**CONCLUDING SESSION**

TWENTY FIFTH GOPALAN ORATION - 2001

THE AWARD

The Gopalan Oration Award was instituted in the year 1974 by the Nutrition Society of India in honour of the Founder-President, Dr. C. Gopalan, who has been the guiding force behind the Society since its inception. In his capacity as the Founder-President and as a permanent Executive Committee Member, Dr. Gopalan has nurtured the Society and has built is up to its present stature. The Society, as it is today, bears testimony to his genius as an architect and father of nutrition sciences in India.

Dr. Gopalan, presently President, Nutrition Foundation of India, is a scientist of international eminence and has spearheaded the cause of nutrition science for over four decades. His contribution towards the betterment of nutrition of population has benefited not only India but other developing countries as well. It has helped strengthen and inspire movements for the eradication of under-nutrition among the underprivileged in many Third World countries.

Dr. Gopalan had a brilliant academic career at the Madras Medical College and obtained a Doctoral degree in Medicine. During his illustrious career, Dr. Gopalan has held several prestigious positions with distinction that has brought fame not only to him but to his country as well. He was the first Asian to be elected the President of the International Union of Nutrition Sciences and the first Chairman of the Regional Advisory Committee on Medical Research for South-East Asia of WHO. He was on several World Health Organisation Expert Panels for many years and was the Chairman of the Technical Session of the World Health Assembly. He was elected Fellow of the Royal Society of London. He was also the first Nuffield Foundation Fellow from India in Medical Research Council of United Kingdom and a Rockfeller Foundation Fellow.

The National Institute of Nutrition (NIN), Hyderabad, India, was nurtured by Dr. Gopalan with rare dedication as its Director from 1960-1974. Dr. Gopalan was also responsible for forging a fraternity of Asian nutrition scientists and initiating the series of Asian Congress of Nutrition which led to the formation of the Federation of Asian Nutrition Societies. He is an able administrator and a visionary. During his tenure, as the Director of NIN and later as the Director-General of ICMR, the country as a whole focused its attention on nutritional and medical problems of public health importance. Under his leadership a wealth of information was generated to tackle problems such as Protein Energy Malnutrition, Vitamin A deficiency, Phrynoderma, Lathyrism, Fluorosis and Pellagra. The foundation of the National Nutrition Monitoring Bureau was laid by him. Dr. Gopalan has also created the Nutrition Foundation of India, which has a wide interdisciplinary research network in the country and has brought out valuable report which are of great value to nutrition scientists, administrators and also policy makers. Some of the renowned national and international honours bestowed on him for his outstanding contributions include Dr. B.C. Roy National Award (1974), Dhanvanthri Award (1978), WHO Health for All Medal (1988), Sir C.V. Raman Gold Medal of the Indian National Science Academy (1988), International Union of Nutrition Sciences Award (1989), R.D. Birla Award (1990) and Fellow of the International Union of Nutrition Sciences (1993).

The Gopalan Oration Award is given every year to an expert who has made significant contributions in the field of nutrition and allied sciences.

The Nutrition Society of India is proud to announce that the Twenty Fifth Gopalan Oration will be delivered on December 5, 2001 at CIAE, Nabibagh Bhopal, by Dr. B. S. Narasinga Rao, Retired Director, National Institute of Nutrition (ICMR), Hyderabad.

THE RECIPIENT :

1. Name : **BAGEPALLI SUBBA RAO NARASINGA RAO**

2. Date of Birth : August 11, 1928

3. Field of Specialisation : Biochemistry - Major Discipline.
   Nutrition - Subject of Specialisation.

4. Designation : Retired Director, National Institute of Nutrition (ICMR), Hyderabad.

5. Address Official :
   Director-Emeritus
   National Institute of Nutrition
   Jamai-Osmania PO, Hyderabad-500 007, India

   Phone : 91-40-7018909
   Fax : 91-40-7019074
   E-mail : nin@ap.ap.nic.in

   Residence :
   1-2-62/3, 11/4 M Block
   Kakateeyanagar, Habsiguda, Hyderabad-500 007, India

   Phone : 91-40-7173344
   E-mail : bnmohan@hd2.dot.net.in

6. Academic Qualifications :
   B.Sc. (Hons) (Chemistry) 1949 FIRST CLASS
   FIRST RANK

   Ph.D. (Biochemistry) 1955
   (By Thesis)

   Post-Doctoral USPH Fellowship as Trainee in Biophysics at Mass General Hospital, Harvard University, Boston, Mass, USA (1959- 1961)

7. AWARDS

   a) **Government of Mysore, Prize for Standing First in B.Sc. (Hons) (Chemistry), 1949.**
   b) **Rama Rao Memorial Oration Award, Society of Biological Chemists of India, 1985.**
   c) **Srikantia Memorial Lecture Award, Nutrition Society of India, 1993.**
   d) **Kellogg Oration Award, Indian Dietetic Association, 1998.**
   e) **Gopalan Oration Award, Nutrition Society of India, 2001.**

8. PEER RECOGNITION

   a) President, Nutrition Society of India, 1999-2001, 2001-2003.
   b) Vice-President, IX Asian Nutrition Congress - 2003, to be organised in India.
   c) Fellow of Indian National Science Academy to write History of Nutrition Research in India (1994-1998) - Completed.
   d) Nutrition Consultant, WHO/WIPRO, Manila, 1996.
   e) Fellow of National Academy of Medical Sciences, India, 1989.

f) Fellow of National Academy of Agricultural Sciences, India, 1999.

g) Chairman, Indian Nutrition Advisory Committee on Palm Oil, MPOP, Malaysia, 1989-1998.

h) Joint FAO/WHO Food Contamination Programme, Member, Technical Advisory Committee.

i) Member, INACG, 1974-1979.

j) WHO Travelling Fellowship to visit International Nutrition Research Centre.

k) Ford Foundation Travel Fellowship to visit Contraceptive Research Centres.

l) Expert Member/Member Secretary / Chairman of Scientific Committees and Expert Group on Food and Nutrition and related field set up by National Agencies (1970-1995) like ICMR, CSIR, DST, NIPCED, AEWC. Health and Agriculture Ministries, Planning Commission, etc.

9. RESEARCH EXPERIENCE

Forty years experience at NIN, at Coonoor and Hyderabad. Guided 26 Ph.D. students and 6 M.Sc. in Nutritional Biochemistry/Food and Nutrition.

10. PROFESSIONAL EMPLOYMENT :

a) 1949-51 : Lecturer in Chemistry; Central College, Bangalore.

b) 1951-55 : Parlakinedi and Raptakos; Nutrition Research fellow Laboratories, Coonor

c) 1955-59 : Research Scientist.

d) 1959-83 : Research Scientist, Asst. Director and Deputy Director, National Institute of Nutrition, Hyderabad.

e) 1983-88 : Director, National Institute of Nutrition, Hyderabad.

f) 1988 : Consultant Nutrition Advisory Committee on Palm Oil : MPOPC : Kualumpur.

g) 1994-98 : INSA fellowship to write a book on History of Nutrition Research in India.

Areas of Research : Protein Nutrition, Protein Energy Malnutrition, Nutrient Requirements of Indians, Anaemia, Iron Nutrition, IDD, Iron and iodine fortification of salt and their field testing, Fluorosis, Nutrition and Urolithaisis, Pellagra, Energy metabolism and requirements, Nutrition and Work output, Nutrition and Drug Pharmacokinetics, Food Chemistry, Food Toxins, Community Nutrition A semi-longitudinal study of growth and development of rural children.

No. of Scientific Papers published - 230

(B.S. NARASINGA RAO)

RECIPIENTS OF GOPALAN ORATION AWARD

1977 *Dr. B.D. Jelliffe*
World Trends in Infants Feeding.

1978 *Dr. J. Cravioto*
Intersensory Integration as a Function of Nutrition and Stimulation

1979 *Dr. M. Behar*
National Nutrition Policy & Trace Elements and Metabolism

1980 *Dr. M. S. Swaminathan*
Green Power and Freedom from Hunger.

1981 *Dr. V.M. Dandekar*
Measurement of Undernutrition.

1982 *Dr. S. Varadarajan*
Technology for Better Nutrition.

1983 *Dr. H.K. Jain*
Evolutionary March of Indian Agriculture.

1984 *Dr. S. G. Srikantia*
Nutrition Adaptation in Man.

1985 *Dr. K. T. Achaya*
Invisible Fats Revised.

1986 *Dr. V. Kurien*
Oil and Fats Beyond Nutrition

1987 *Dr. R. K. Chandra*
Nutrition Immunity and Clinical Outcome.

1988 *Dr. Anand S. Prasad*
Human Zinc Deficiency

1989 *Dr. J.V.G.A. Durnin*
Is Satisfactory Energy Balance Possible on Low Energy Intake ?

1990 *Dr. J.C. Waterlow*
A New Look at Protein-Energy Malnutrition - controversies and Challenges.

1991 *Dr. Vernon R. Young*
Amino Acids Kinetics in Humans

1992 *Dr. M. C. Latham*
Alleviating Malnutrition in the developing countries of the World.

1993 *Dr. Nevin S. Scrimshaw*
Complementarities among foods and nutrients.

1994 *Dr. W.P.T. James*
Assessing energy Need : Recent Advances.

1995 *Dr. Florentino S. Solon*
Food Fortification Programme Development in the Philippines.

1996 *Dr. John D Potter*
Plant Foods and Cancer Risk - Science and Tradition.

1997 *Dr. B.N. Tandon*
Nutrition Intervention in 2000 AD

1998 *Dr. Atremis P. Simopoulos*
Genetic variation and nutrition.

1999 *Dr. R. S. Paroda*
Household Food and Nutritional Security Through Advances in Agriculture.

2000 *Gurdev S Khush*

Strategies to Meet the Global Food and Nutrient Needs in the New Millennium.

NEWER PERSPECTIVES IN ENERGY NUTRITION AND MALNUTRITION AND THEIR RELEVANCE TO INDIA

B. S. Narasinga Rao

Abstract

Energy is an essential nutrient for man to lead an active and healthy life. There have been efforts to establish human energy requirements and recommended dietary energy intake for different physiological groups by the National and International Nutrition Bodies since early nineties. The approaches to establish human energy requirements were earlier based on dietary intake of energy by healthy population groups. Subsequently, they were based on daily energy expenditure by the activity break-up method. In 1985, FAO/WHO/UNU suggested the desirable energy intakes by different physiological groups in terms of BMR units. Currently energy requirement of these groups have been determined by the use of doubly labelled water technique. This approach is currently being used in several countries to re-assess the energy requirements of adult men and women. Besides energy expenditure, energy cost of growth, tissue deposition and milk secretion have been included to arrive at the energy requirement of infants, children, pregnant and lactating mothers. The relative merits and demerits of these and the other useful methods will be discussed.

Application of energy requirement recommended for different physiological groups with reference or desirable body weights to population group in developing countries may results in an over-estimation of requirement, since the actual body weights of the adult population in these countries are much below the reference body weights. This issue requires, a closer examination since such an over-estimation of energy requirements may have far reaching nutritional social and agro-economic implications.

The diets of population in developing country like India is predominantly based on cereals with low fat content. Such cereal-based diets due to their low energy density cannot meet adequately the energy requirement of different groups although such low energy density diets have satiety value. Therefore, there is an absolute need for including adequate levels of fat in their diets. The need for adequate level of fat in the diets of low income groups (particularly among young children) to meet their energy needs will be examined on the basis of available data. Another aspect of cereal based diets which needs to be examined is the over-estimation of their carbohydrate content which has resulted in an over-estimation of energy intakes of Indian population.

These population groups in developing countries suffer from dietary deficiency of other nutrients besides energy. The metabolic relationship between energy and other nutrient deficiencies in meeting energy requirements will also be discussed. In the light of these and the other factors, the practical aspects of combating undernutrition and malnutrition among low income group population in the developing countries, and who manifest dietary deficiency of other nutrients besides energy will be discussed.

It can be concluded stated that there are a number of lacunae in our current knowledge and approaches for assessment of energy requirements, the extent of energy malnutrition and methods of combating it among population groups in developing countries. These aspects will be examined critically and the possible modification of the current understanding and strategies will be discussed.

THIRTEENTH SRIKANTIA MEMORIAL LECTURE - 2001

THE AWARD

Srikantia Oration Award has been instituted by the Nutrition Society of India to honour late Dr. s.G. Srikantia, one of the Founder-Members of Society. As a Member, and later as its Treasurer (1974-1978) and Vice-President (1978-80), Dr. Srikantia was instrumental in building, expanding and consolidating the activities of the Society.

Dr. Srikantia was born in 1926 in an illustrious family in Mysore. After his brilliant undergraduate career in Mysore Medical College, he joined the National Institute of Nutrition - then known as the Nutrition Research Laboratotries, in 1951. He served the Institute with rare distinction and dedication for more than three decades till his voluntary retirement in 1980. From 1974 to 1980, he was the Director of the Institute and contributed to the growth and development of the Institute.

Dr. Srikantia was an internationally renowned scientist with outstanding contributions in clinical nutrition. He was a versatile, knowledgeable and well informed nutrition scientist not only in cilincal nutrition but also in nutritional biochemistry and public health nutrition. Under his able stewardship, the National Institute of Nutrition diversified its research activities and had a coordinated approach,which added new dimension and depth to nutrition research.

A scientist with ideas, vision, initiative and drive, he could enthuse colleagues in an inimitable, gentle and persuasive manner. His elegant studies on the role of ferritin in the pathogenesis of nutritional oedema have attracted considerable attention. His pioneering research conbributions on protein energy malnutrition, vitamin A deficiency, nutritional anaemias, pellagra and fluorosis have earned him academic recognition. He led the studies on the prevention and control of vitamin A deficiency in the country and was the man behind the National Vitamin A Prophylaxis Programme. Even after his voluntary retirement, he continued to be active in research and teaching, and was associated with the University of Mysore, and served as Temporary Adivser, WHO. He was a member of the Editorial Board of the Indian Journal of Medical Research, and was valued for his unbiased critical and mature views on a wide range of topics.

Dr. Srikantia has several publications to his credit including Chapters in books. He was frequently invited by national and international agencies to be on their expert committees.

He was a tower of support and strength to the Nutrition Foundation of India, and played a leading role in the formulation and implementation of many of its research projects and in the preparation of its scientific reports.

A man of simple habits and sterling qualities; upright, sincere and devoted to scientific pursuits and loyal to the committed cause, Srikantia was a friend, philosopher and guide to many a junior colleague. He was a diamond among men, transparent in his dealing with people, dazzling in intelligence, hard in getting the work done and sharp in seeing through people.

THE RECIPIENT

Dr. Prema Ramchandran graduated from Madras Medical College and obtained MD (Obst. & Gyn.) from JIMER Pondichery. She held University first ranking in the MD (Obst. & Gyn.) Examination of the Madras University in 1971. She obtained. MNAMS Degree of the National Adademy of Medical Sciences in 1974.

Soon after post graduation she joined the Indian Council of Medical Research, between 1976 and 1986 she worked in NIN and undertook laboratory, clinic and community based studies to explore health, nutrition and fertility interactions in mother child dyad in undernourished communities. The findings from these studies provided the scientific rationale for many of the ongoing National programmes for improving health and nutritional status of women and children.

She joined the ICMR Head quarters office in 1986 and for a decade worked on emerging problem of HIV infection in India. In 1995 she has joined the Planning Commission as Adviser (Health, Nutrition and Family Welfare) and has been associated with the Ninth and Tenth Plan formulation for the Health, Family welfare and Nutrition sectors.

She has over 100 publications in the health and nutritional status of mother child dyad in national and international journals. Her studies have won national and international recognition. In 1985 she was elected as a Fellow of the National Academy of Medical Sciences in Maternal and Child Health and Nutrition. She has been the member of the WHO Steering Committees on Maternal and Child Health, and WHO Steering Committee on Contraception.

PREVIOUS RECIPIENTS

1989 *Dr. P. S.Shetty*
Energy Metabolism in Chronic Energy Deficiency.

1990 *Dr. M. Gabr*
Better Nutrition for the World Poor : A Challenge of the Fututre.

1991 *Dr. B.N. Tandon*
Malnutrition and Gastroenterological Disorders.

1992 *Dr. B.S. Narasinga Rao*
Current concepts in human nutrient requirements and allowances - a critique of their use in practice and need for an alternative.

1993 *Dr. Rajammal P. Devadas*
Empowering women towards improving family nutrition.

1994 *Dr. Tara Gopaldas*
Problems and prospects in upscaling Nutrition-Research-Action Projects or Pilots to Programmes.

1995 *Dr. Vinodini Reddy*
Dietary approaches to combat vitamin A deficiency.

1996 *Dr. N. Kochupillai*
Micronutrient Deficiency and Human Health and Development.

1997 *Dr. M. V. Rao*
Population - Food - Nutrition : Challenges and Options Before India.

1998 *Dr. Shanti Ghosh*
Nutrition, Growth and Development - The first two years are crucial

1999 *Dr. Mahtab S. Bamji*
Understanding and combating recognized and less recognized vitamin deficiencies.

2000 *S. Rajagopalan*
Prespective Planning for Human Development

RESEARCH STUDIES ON MOTHER CHILD DYAD-FOUNDATION FOR NATIONAL PROGRAMMES

Prema Ramchandran

During the seventies under the leadership and guidance of Dr. Srikantia several laboratory, clinic and community based studies were undertaken in the National Institute of Nutrition to explore health, nutrition and fertility interactions in mothers child dyad in undernourished communities. The findings of these studies provided the scientific rationale for many of the ongoing intervention programmes of the Dept. of Family Welfare and are the best testimony to the vision and dedication of Dr. Srikantia. In this oration the results of some of the studies that have led to the development of national programmes will be reviewed.

The high low birth weight prevalence and consequent high neonatal and infant mortality has been a cause of concern. Studies undertaken in NIN defined the maternal risk factors associated with low birth weight, and the content quality and timing of antenatal care that would be necessary for detection of these maternal risk factors; studies also showed the benefits of appropriate antenatal care on birth weight in undernourished women from poorer segments of the population and management of anaemia in pregnancy. Recommendations based on these studies are currently being implemented as the components of the antenatal care in Reproductive and Child Health Programme.

Studies undertaken in NIN clearly demonstrated that maternal undernutrition did not have any adverse effect on lactation. Exclusively breast fed infants from poorer segments of the population grew normally during the first six month of life; too early (before six months) or too late introduction of supplements (beyond six months) resulted in growth faltering. Freshly cooked meal from the family pot may be sufficient to meet the extra nutrient needs of the infant after six months of age. Based on these studies nutrition education messages regarding appropriate infant feeding practices have been developed and used; these have resulted in some improvement in infant feeding practices in some states like Kerala. As an attempt to reduce the steep increase in under nutrition in the critical 6-36 month age group in addition to nutrition education, take home cereal, pulse and oil seed based food supplements from 6-36 month old children is being supplied under the Pradhan Manthri Gramodaya Yojana.

Under nourished women whose infants are exclusively breast fed for six months had long period of lactational amenorrhoea and seldom conceived in the first six months. Advent of next pregnancy during lactation had an adverse effect on the nutritional status of the mother and breast fed infant as well the foetus in utero. Initiation of appropriate contraception at the time of introduction of supplements to breast fed infant or return of menstruation will ward off the adverse impact of pregnancy during lactation. IUD/sterilisation do not have any adverse effect on lactation; combination pills introduced after six months does not have any adverse effect on lactation or infant growth. These studies helped in drawing up guidelines for appropriate contraceptive use during lactation.

Studies undertaken in NIN showed that metabolic side effects of oral contraceptives in under nourished population are essentially similar to those seen in well nourished women; bio availability studies established that the dose required by undernourished women was similar to those required by well nourished women. These findings studies led to the introduction of the Oral contraceptives into the National Family Welfare Programme. Reassuring findings that intrauterine contraceptive devices do not aggravate anaemia in undernourished women resulted in increased acceptance of Copper T device in the programme.

KEY NOTE ADDRESS

The Role of Rational Nutrition in Health Care of Children Suffering from Chernobyl Nuclear Power Station Disaster

E. Kapitonova

Professor Pediatrics. Gomel State Medical Institute, Belarus

In the result of the greatest radiation carastrophe happened in Chernobyl Nuclear Power Station, Belarus turned out to be the most suffering Republic. 70 percents of all radioactive fallouts fell onto 30 percents of its territory. This has led to the unprecedented radioactive contamination of the land by long-life radionuclids. 15 years have passed since the catastrophe but the researchers of ecologists, medicine, specialists and other scholars show that some problems born by the accident have not only been solved but became more acute in the number of cases. The observed dynamic of ecology in post-accident period does not mean its improving for the nearest decades.

One of the most acute problems on contaminated territories is is problem of children's health care. More than 700,000 children of Belarus underwent radiation affect within the first month after the disaster. Hundreds of thousands of children still live on territories contaminated by radionuclids. The primary morbidity in children on these territories has increased in 47 p.c. The most common illnesses in suffering children are pulmonary, digestive, nervous system and sense organs diseases.

The desperately important problem for suffering children's health on contaminated territories is nutrition. This is more important especially in infant period when organism of a child is more sensitive to external infecting factors. Scholars still argue on the worth of breast-feeding on contaminated territories for there are data of major infection of breast milk with radionuclids, nitrates and others.

It is estimated that continuing affect of smaller doses of ionizing radiaiton of the organism leads to decrease of vitamins A and E in children and pregnant women. This is the fundament for correction of nutrition and selection of rational vitamins dosage. Special recommendations on nutrition have been developed which would help decrease the harmful influence of radioactive and chemical contamination of environment. But there exist great problem of application of scientists recommendation to understanding of people's masses. Without this, all scientific achievements lose their meaning. In this respect, the work of pediatrics with teenagers, mothers, young parents has an exclusive role and influence on society. The invaluable favor as well do different NQO's, who develop social projects and work with in community.

SYMPOSIUM - I

ON

"NUTRITION AND CHRONIC DISEASE"

NUTRITION AND CHRONIC DISEASE

From time immemorial, man has related diseases with faulty food. With the advent of modern science, dietary basis and genetic predisposition have been in focus with regard to the etiology of chronic diseases. Diabetes mellitus, bone diseases, neurological disorders and cancer are the typical chronic diseases which also become preponderant with ageing. The classical studies of Barker connected 'thrifty genes', to the increased prevalence of glucose intolerance and diabetes on one hand and increased mortality associated with obesity and hypertension on the other in certain population segments which remained undernourished for centuries. Thus, syndrome X has been found to be a major cause of morbidity in India. The high prevalence rates of abdominal obesity and increased cardiovascular disease in Indians living in the Western Countries Vs, those living in India, have provided strong basis for the thrifty genes hypothesis.

Fetal origin of chronic diseases has been drawing the attention of many investigators which relates to the degenerative changes occurring due to early nutritional deprivation of the fetus in the mother's womb. While some generalities have been established with regard to the changing predisposition and environmental influence of early development of a disease, mechanisms for the specific lesions that are involved have not yet been well understood. This particular symposium will address the role of nutrition in the development of disease, connected with different physiological systems like cardiovascular system, bone, intestinal system, brain, etc. In addition to the environmental factors, lifestyles of the individual are known to modify the course of the diseases. Simple changes in food and behaviour could bestow long-term benefits in avoiding or delaying chronic disease. Eminent scientists working in this area have been invited to speak on the role of nutrition in the etiology of such common chronic diseases. The deliberations will highlight the current understanding of the etiology of the disease and provide the guiding principles in the management and, if possible in the prevention/delay of such diseases.

SYMPOSIUM - II

ON

"WOMEN'S ROLE IN IMPROVING THE NUTRITIONAL STATUS OF THE COMMUNITY"

WOMEN'S ROLE IN IMPROVING THE NUTRITIONAL STATUS OF THE COMMUNITY

Over the last decade, the central role of women in meeting the basic needs of the family like preparation of food has been well realised. Improved literacy levels and economic empowerment of women has found to be associated with better health of the children in the family. Models have been worked out for utilizing women as changed agents to educate the community and transform the dietary habits and health status of the family. Women constitute a good part of the agricultural force in the villages and also cook and serve food at home. Nationwide surveys have indicated that the nutritional status and the psychological needs of the women received low priority in the family and this could be one of the major reasons for their vulnerability to malnutrition and disease. The burden of pregnancy and lactation, maintenance of food and economic balance at home combined with her role as the emotional buffer, have compromised her physical health and disability.

Both governmental and non-governmental organizations are advocating 'the life cycle' approach and are concentrating on the reproductive and child health as important elements in planning and implementation of health programmes. Nutrition, financial independence and education for women are being stressed as important prerequisites to improve the nutritional status of the community. Empowerment of women either directly or indirectly by encouraging entrepreneurship in agriculture or horticulture are some of the mechanisms suggested to place women in the centre of decision making. Experiences in the areas of cooperative movement, agriculture and horticulture coupled with the role of women as health entrepreneur could be blended and replicated to benefit the communities. Several such aspects will be deliberated at the symposium. The speakers will highlight the different strategies through which women can play a role in alleviating the health status of the community. This should be interest to planners policy makers and social workers.

Promotion of Food Safety and Quality for Food Service - Networking and Building Alliances in India : A New Food Safety Initiative of the Ministry of Health

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I. Introduction and Need for a New Food Safety Initiative.

Food is one of the basic necessities of life. The food consumed should be adequate not only in terms o quantity but also be of good quality, free from microbiological and chemical contamination. Prevention o food borne diseases is a major public health concern. Food contamination, apart from affecting healt results in substantial economic losses which includes the cost of treatment of food borne diseases an loss of earnings.

In recent years there has been a growing demand for renewing the International Health Regulatio (IHR). The provisions of IHR adopted by the WHO in 1969 provides for preventing the internationa spread of infectious diseases through permanent national public health measures for travellers, carg and points of entry. The World Health Assembly during 1995 has called for the revision of the IHR fo providing a new framework for assessing and containing urgent public health risks of international im- portance. It has included non-infectious agents such as toxins and chemicals in food. The interim IHR draft will be sent to member state by 2002 and the target date for submission of revised IHR to the World Health Assembly is May 2004. Thus, it is likely that in the near future food contaminants and toxins will be a part of International Health Regulations.

In the post WTO era of globalization, the Codex Alimentarius Commission has been recognized as the sole agency having a great impact on the quality and safety of the world food supply. Codex has helped to upgrade standards for food manufacturing, processing, safety and quality all over the world and has contributed to an increase in International Food trade. It harmonizes various food codes all over the world. Since India is a signatory to the WTO, it has to follow the Codex recommendations regarding Food Safety and quality issues in foods moving in the international trade. Thus, issues of Food Safety/ Quality will be of considerable economic importance.

A relative new approach in the food safety/quality area is the Hazard Analysis Critical Control Point (HACCP) system. This system seeks to identify hazards associated with any stages of food production, processing or preparation, assess the related risks and determine the operations where control proce- dure will be effective. Thus, control procedures are directed at specific operations that are critical in ensuring the safety of foods. Under the WTO regimen with Codex as the focal point, in the near future, food importing developed countries of the world insist that all foods that are exported from India need to comply with the HACCP system.

Tourism is another sun rise industry, which is linked to food safety/quality issues. The foods served to the foreign tourists have to be safe and wholesome. Promotion of tourism heavily depends on safe food supply at home. In recent years, the number of people eating outside their homes have increased. The factors contributing to this trend includes the changes of life styles. rapid urbanization, increased number of working women, etc. With the increasing number of Public Catering establishments, it is imperative that sufficient attention is focused as quality assurance and hygiene standards. Many of the problems concerned with food safety in public catering can be solved by studying the basic issues in- volved in food hygiene, imparting appropriate education and providing managerial inputs.

II. Infrastructure Availability for Food Safety/Quality

India has a great cultural and historical background and a considerable talent of manpower, expertise, and institutions regarding food safety and quality. The various food safety/quality issues have been traditionally woven into the cultural pattern since time immemorial. A good example for this is the consumption of only boiled milk and never raw milk in the entire length and breadth of the country. In the ancient text Arthashastra written by Chankya, there were references to the adulteration, its regulation including fines to be imposed.

The modern infrastructure connected with food safety quality includes the following:

1. The research Institutions numbering over a dozen belonging to the Indian Council of Medical Research (ICMR), Council for Scientific and Industrial Research (CSIR), Indian Council of Agriculture Research (ICAR), Defense Research Development Organization (DRDO), Department of Atomic Energy (DAE), National Dairy Development Board (NDDB) and the various Ministries such as Ministry of Health, Commerce, Food and Agriculture. These institutions have been carrying research work in the areas of Food Safety and Quality mainly pertaining to surveillance of environmental contaminants, adulterants and food colours, evolving methods for their detection, finding out their biological effects and health hazards, etc.

2. The various Food Control Laboratories under the aegis of (i) Ministry of Health both Central and State numbering over 75, (ii) The Apex, regional and commodity testing laboratories of the Directorate of Marketing and Inspection (Total 29), (iii) Laboratories of Export Inspection Agencies (Total 33), (iv) Composite Food Laboratories of the Army (Total 7), (v) Laboratories of Quasi Government agencies like FCI (Total 10). All these laboratories were mainly concerned with carrying out routine analysis of food samples for various food quality parameters mainly for regulatory purposes.

3. Home Science Colleges under the ICAR and the State Agricultural Universities as well as traditional universities and Deemed Institution System. There are several Home Science Colleges imparting education on Nutrition, Food Safety Quality issues existing in the country. They train a large number of students at the graduate, postgraduate and doctoral levels. They also carry out research on various issues such as street foods, food colours and other additives, food safety education and the community participation. They prepare multimedia educational materials and carry out extension work.

4. Catering Hotel Management Institutions: The Ministry of Tourism in collaboration with respective State Governments has been running premier Catering and Hotel Management Institution offering 3 year diploma programmes all over the country. Besides, there are several teaching institutions have recently sprung all over the country numbering over 100 imparting Degree/Diploma programmes. Besides there are several Vocational Institutions offering 6 months to 1 year programme in Cookery/ Baking and related area. All these institutions chura out students who work in the Food Service industry and have interest in Food Safety Quality.

5. Traditional and Distant Education Bodies: Though a large number of educational institutions under the traditional universities in India exists, they have not been offering courses and training programmes in the area of food safety and quality. The one exception to this has been the introduction of vocational education based 3 years degree programme on Food Quality by the UGC in selected colleges in the country. Besides, in some instances, a four year Food Teaching degree programmes are being conducted in selected Technology/Engineering Institute which have a component of Food Safety and Quality. An exclusive Certificate/Diploma programme in Food Safety/Quality is being introduced in the Distance Education Mode by the Indira Gandhi Open University of Delhi.

6. Scientific Professional Societies: India being a large repository of scientific talent has many scientific professional societies in the area of Food Science, Nutrition and Dietetic. These include the Nutrition Society of India, Indian Dietetic Association and the Association of Food Scientists and Technologists. These societies of all India Nature have membership of several thousand professional scientists and technologists, and function with having 25-50 chapters all over the major cities in the country. Their activities include conducting annual scientific meetings, publication of research and popular journals, newsletters, etc. The chapters of these societies conduct regular meetings, training programmes, interacting with the Food Industry and extension work at the grass root level.

Besides the above, Government/Quasi Government systems in the public domain, there are other organized players in the private sector which have an interest in the Food Safety/Quality System in the country. These include the following:

1 . The individual business houses connected with food:

Some. of the leading multinational companies having interest in promoting business in the area of food like the Hindustan Lever, Britannia, etc. have their own R&D units carrying out research work pertaining to quality issues like HACCP, routine end-product Quality Control confirming mainly to their products.

2. Trade Associations:

Each of the trade connected with food have their own associations at National, State and Local level. Example for this include the Federation of Indian Chamber of Commerce and Industry (FICCI), Confederation of Indian Industry and sectoral organizations like Vanaspati Manufacturer Association, All India Food Preservers Association, Protein Foods and Nutrition Development Association, Indian Confectionery Manufacturers Association, Harmless Food Colours Association of India, Perfumes and Flavours Association of India, Soybean Processors Association Of India, Mustard Research and Promotion Consortium, The Solvent Extractors Association of India, various Hotel Associations and their Federations. However, their main concern is to represent to the Government on relaxation of rules and regulations pertaining to food safety and quality issues.

3. Voluntary Agencies and Consumer bodies:

There are a large number of tiny and a few well-established voluntary organizations and consumer bodies like VOICE- Delhi, CUTS-Calcutta, Consumer Education and Research Centre, Ahmedabad functioning as non-governmental organization. Their main activity is to highlight the issues of Food Safety and Quality as it affects the health of the people, bring out the deceptive, fraudulent and unethical practices of the industry/business houses, look after the consumer interests, and carry out extension work.

III Action Plan for Promotion of Food Safety and Quality.

A master plan of action for the promotion of Food Safety and Quality in the country is being drawn at the initiative of the Ministry of Health, Government of India. The major objectives of the bold initiative are,

1. Networking and building alliances in the area of Food Safety and Quality related to Food production, distribution and services.

2. Coordinate research, education and extension activities at the national level.

3. Build in the component of Information, Education and Communication activities in to the regulatory

regimen of Food Safety, Quality and adulteration for foods that are exported, imported and produced, traded and consumed domestically.

4. Liaison with various Governmental (Ministries both at the Centre and State level), non-governmental and international bodies (ex- Codex Alimentarius Commission) concerned with Food Safety and Quality.

The initiative involves close interaction among various ministries such as Health, Commerce, Tourism, Agriculture, Food, Environment and Civil Supplies. Since food is in the concurrent list, involvement of various State Governments who are mainly concerned with the implementation of the various food safety/ quality issues is of considerable importance. The involvement of various stakeholders such as the industry, voluntary and consumer bodies as also the interaction involving the extension infrastructure built up in the country in the part as listed earlier is essential. It is in this direction, the Ministry of Health is considering designating the National Institute of Nutrition (NIN) as the coordinating agency evolving a strategy and action plan for promotion of Food Safety and Quality in the country. To begin with, a work-shop is being organized by the Ministry of Health with the assistance of WHO at the NIN during January 18-19, 2002.

The proposed Action programme includes the following:

1. Creation of a Database:

   A database of organization that have considerable experience in research, teaching, extension and implementation of the various Food Safety programme will be created. The work that has been carried out by each of the organization need to be documented. Although good work has been done in the past, they have been on isolated manner. The areas of work depended on the interest of the committed individual and restricted to local scenario without any sustainability. The database would include list of organizations, persons involved, data generated, resource materials like books, pam-phlets, charts, slides and other communication materials suitable for print and electronic media.

2. Planning and Execution of Coordinated Research Work:

   Research studies have been conducted in various institutions in India regarding

   i. Street Foods

   ii. Surveillance of environmental contaminants

   iii. Detection of permitted or unpermitted food colour and their dietary intake

   iv. Identification of traditional and newer adulterants

   v. Investigation of Food borne disease

   vi. Toxicological evaluation

   vii. HACCP

   viii. Microbiological studies of various foods

   There is an urgent need to identify high risk sectors of food, high risk areas, high risk seasons, carry out HACCP studies, and evolve ideal prevention programmes. The studies undertaken in the

Educational Institution are mostly in the form of M.Sc./Ph.D. Thesis and are mostly unpublished. It i essential to have an All India Coordinated Research Programme involving agencies such as CSIR ICAR/ICMR and DRDO.

3. Addition of Food Safety/Quality Issues in the Syllabus of Educational Institutions:

The curriculum of various educational programme of both Home Science as well as Catering and Hotel Management Institution needs to be updated in the inclusion of the Food Safety issues such as elementary food microbiology, HACCP, Food borne illness cause and control, Food law regulations Labeling, Adulteration, Consumer protection, Codex Alimentarius Commission work, Food processing aids, Food handling, Hygiene sanitation, Environmental sanitation including personal hygiene waste disposal, etc.

4. Preparation -and Updating Communication Materials and Evolving communication Strategies:

Food safety messages for communication purposes through print and visual media, and for training purposes need to be prepared. The training methods include use of lectures, film shows, exhibitions, flash cards, flip charts, banners, posters, pamphlets, leaflets, radio talks, television, field media as puppet shows and websites. The materials for Information, Education and Communication need to be prepared both in English and regional languages. It has to be borne in mind that a vast majority of the food handlers are illiterate or semiliterate people and the materials have to be evolved to cater to their needs.

5. Continuing Education Programmes:

The need for continuing education programme through the Distance Education Mode or establishment of specific Food Safety Certification programmes is a priority area. The Indira Gandhi Open University has initiated. Certification and Diploma programmes in Food Safety/Quality which could well be followed by other Distance Education providers like the State level Open Universities. Also, a various food handlers including those in well established Food Service establishment like Star Category Hotel, should have opportunities for Food Safety Certification programmes. The use of Internet, Website and Information Technology could be handy for such purposes.

Conclusion

A strategic plan for improving food safety in the country and its successful implementation would make Indian food supply one of the safest in the world. It would reduce food borne illness in the country, assist in obtaining a favourable economic return to the country, food export and increase tourist potential.

DEVELOPMENT OF NATIONAL NUTRITION SURVEILLANCE SYSTEM

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INTRODUCTION

Undernutrition among young children and underweight among adults continue to be important public health problems In the country, even after 50 years of Independence[1]. The low production in industry as well as agriculture has been attributed to poor nutritional status of the people in our country. Promotion of nutritional well being of people is one of the essential elements of primary health care to achieve Health For All by 2000 AD. The Government of India adopted the National Nutrition Policy (NNP) In 1993[2] to control and combat the widespread malnutrition in the country. A National Plan of Action on Nutrition (NPAN)[3] has also been formulated to translate the NNP into action. One of the Important recommendations of NNP is establishment of a National Nutrition Surveillance System (NSS) to identify the nutrition problems early in the at-risk groups, and initiate appropriate action, so as to promote optimal nutrition.

WHAT IS NUTRITION SURVEILLANCE?

Nutrition Surveillance may be defined as ***watching over nutrition in order to make decisions, which will lead, to improvement in nutritional status of populations***[4] Quite often, the terms "nutrition surveillance" and "nutrition monitoring" are wrongly used synonymously. Nutrition monitoring refers to "repeated measurements of the nutritional status, at regular intervals, of population or a specific group of individuals over a period of time". This is usually an integral part of nutrition surveillance. In contrast to monitoring or routine surveys, ***nutrition surveillance encompasses analysis and action to promote better health and nutrition.***

USES OF NSS

1. The nutrition surveillance system provides information on the current nutritional status, the spatial distribution of nutrition problems, causes, and changes in the prevalence/incidence over time, the actions initiated and their effects.
2. The NSS would help in early diagnosis, initiating of prompt and immediate remedial measures to control undernutrition and, in turn, promote the nutritional status.
3. It can also assist In the identification of geographic areas with nutrition problems requiring immediate attention and seasons of nutritional stress.
4. The NSS can also be used for performance appraisal of the ongoing intervention programmes and assessment of contributory factors. The national nutritional surveillance can be used to find out the factors affecting the performance of the ongoing nutrition programmes.
5. It could help the administration In prioritizing actions, so as to modify policies and programmes from time to time.
8. The NSS can provide information on nutritional trends over the period and help in establishing a database on nutrition and related indicators to enable assessment, constantly, of the extent of achievement of the national nutritional goals.

OBJECTIVES OF NUTRITION SURVEILLANCE

1 . One of the main objectives of nutrition surveillance should be to promote actions that will alleviate or prevent malnutrition, based on the information collected.
2. It also should provide information on nutrition and health of communities to help in the preparation of action plans at different levels.

3. It would assist in the management and evaluation of health and nutrition related programmes.
4. The Nutrition Surveillance should also be able to provide timely warning about impending nutrition disasters.
5. The information collected in NSS should prompt initiation of appropriate intervention programmes to prevent the occurrence of nutritional disorders. Surveillance should never exist in isolation from action.

REQUIREMENTS OF NSS

Clearly identification and decision as to which of the major nutrition related problems require surveillance are essential. It should be remembered that only those problems that could be managed by the peripheral workers with the available resources should be included. The potential sources of data should be identified and steps should be initiated to collected the required information. What is more important is to make necessary institutional arrangements for data collection. Since NSS is action oriented, appropriate policies and programmes and their implementation should be determined, at the outset. These can be in tune with the National Nutrition Policy and the National Plan of Action on Nutrition.

INFRASTRUCTURE FOR NSS

The important step in the establishment of national NSS is identification of suitable infrastructure. It is always preferable to make use of the existing infrastructure rather than establishing a new set up. In India, the Integrated Child Development Services (ICDS), one of the largest nationwide child development programmes is, perhaps, best suited for developing NSS at the national level for the following reasons:

- It is currently in operation in most of the community development blocks in the country and, as per the NNP, will be expanded to the entire rural and 50% of the urban areas of the country.
- It has the necessary infrastructure and trained manpower with a built-in management information system from the village level up to the national level.
- The Department of Women and Child Development (DWCD), Government of India, which is the nodal agency for implementing the National Nutrition Policy and the National Plan of Action for Nutrition, sponsors the programme. The respective State governments implement it.
- All the nutrition goals set by the NNP are mostly covered by the ICDS activities. The Department of Health, which has extensive infrastructure in the rural areas, can also be considered as the delivery mechanism for nutrition surveillance. A comparison between ICDS and the Department of Health is presented below:

Infrastructure for Nutrition Surveillance System - Comparison between ICDS and Health

Nutrition goals/activities	Programme	Health	ICDS
Reduction of PEM	Supplementation	No	Yes
	Growth monitoring	No	Yes
	Birth Weight	±	-
Eradication of vitamin A blindness	Vitamin A supplementation	Yes	Yes
Reduction of Nutr. Anaemias	Folifer distribution	Yes	Yes
Eradication of IDD	Iodized salt	Yes	No
Increasing Nutr. Awareness	Nutrition education	±	±
	Presence of village level worker	No	Yes
Management information	Regular reporting	±	Yes

Thus, it appears that a system, which involves both the health functionaries and ICDS workers, would be more effective for nutrition surveillance. Steps should therefore be taken to involve both these workers from the very beginning.

Monthly Progress Reporting of ICDS and its Limitations

At present, Anganwadi Workers (AWW) at the anganwadi centre (village) level monitor the ICDS scheme through a system of monthly progress reports (MPR), compiled. The Supervisors and the Child Development Project Officers (CDPOS) consolidate these MPRs. These contain mostly quantitative information on the coverage under different components of ICDS (Process variables). It does not have any provision to identify, at different levels, "nonresponders" or "problem areas" so that corrective action could be immediately initiated. This requires information on the reasons for lower coverage, non-response and the causes for continued growth faltering. At present, no Information is collected about the reasons for low coverage for a) supplementary feeding programme, b) National health and nutrition programmes (semiannual distribution of massive dose of vitamin A, nutritional anaemia control programme. Universal immunization programme etc.). In addition, the characteristics of nutritionally at-risk population are not provided. No critical review of the MPRs is carried out at the levels at which these are collected i.e. AWCs/Sectors/Projects/Districts/State, to improve the performance of the programmes.

MODIFIED MPRS

The information in the MPRs should, therefore, facilitate identification of areas (AWC/Sectors/Projects) with higher incidence of undernutrition, morbidity / mortality and those performing poorly with respect to national nutrition programmes. This would help in taking corrective actions to achieve the objective of reducing malnutrition in children at the level of collection of data.

NUTRITION SURVEILLANCE THROUGH ICDS

The Department of Women and Child Development (DWCD), Government of India, is the nodal agency for the implementation of NNP, and is also responsible for developing a National Nutrition Surveillance system along with the NIN and National Nutrition Monitoring Bureau. The National Institute of Nutrition (NIN), after an operational research project, with the financial support of DWCD, Government of India, developed a nutrition surveillance system in the State of Andhra Pradesh. The objectives of the operational research project were:

* To assess the feasibility of developing nutrition surveillance system, using ICDS infrastructure,
* To develop a training module for use by the implementing departments of other States, and
* To develop a computer software package to help in the compilation of the reports.

OPERATIONAL RESEARCH PROJECT IN ANDHRA PRADESH

The three-year research project was initiated in August 1994. From the very beginning, the Department of Women and Child Welfare (DWCW), Government of Andhra Pradesh, which implements ICDS in the State, was involved in the administration of the surveillance activities, and the NIN provided technical guidance and support for training and orientation of the ICDS functionaries. The existing MPRs were modified, taking into consideration the opinions of the functionaries, to obtain information that would help in achieving the national nutrition goals. For the purpose, a series of workshops for various functionaries of ICDS was organized in one of the districts to elicit information from the functionaries about utilizing the ICDS infrastructure for NSS, and to find out the feasibility of using modified MPRs for the regular reporting system.

Subsequently, the formats were finalized. During the Implementation of the project, the process of dose interaction between the project team from NIN and all the categories of functionaries was continued for a period of 17 months by holding workshops, each for duration of 2-3 days In different districts. These workshops were interactive during which the functionaries also learnt the process of analysing the formats and initiating appropriate action. Considering the practical problems and the technical requirements, the frequency of reporting was fixed to be once in a quarter (Quarterly Progress Reporting), coinciding with the month of the

quarterly surveys, Instead of once in a month. This reduced the burden of workload on AWW and Supervisor, and offset any extra efforts that might be necessary on the part of the functionaries as a result of additional data collection in the modified MPRS. The monthly monitoring of children attending the anganwadi centres, as part of the current MPRs was not disturbed. The filled-in formats were reviewed in three consecutive workshops and necessary modifications suggested by the ICDS functionaries, were incorporated into the formats.

Contents of Modified Formats

- Identification particulars of beneficiaries ***not registered,***
- Identification of beneficiaries not ***participating*** in the various components of ICDS programme like supplementary feeding and preschool education,
- Particulars of individuals ***not receiving immunization.***
- Data on children and women ***not participating*** in the national nutrition programmes,
- Information on children ***not regularly covered*** in growth monitoring,
- Inclusion of ***nutritional deficiency signs,***
- Particulars of children showing ***deterioration in nutritional status*** in terms of nutritional grades as well as ***growth faltering*** and
- Identification of children with ***low birth weight*** (LBW)

Particulars of infant and maternal deaths (IMR, MMR).

Since a progress report at the sector level is essential, a suitable format for Sector level was designed, in Consultation with the Supervisors and CDPOs to provide information on the AWCs with low coverage for national nutrition programmes, nutrition profile of young children and information on mortality and morbidity and low birth weight. A summary sheet, consisting of information on all the important variables, was provided at the end of NSS formats, from sector level onwards. It may be mentioned that, earlier, consolidation of reports was done only at the project level.

At the sector level, the Supervisor was also trained to prepare a 'nutrition map' of her sector, indicating the nutritional status of children based on different nutrition grades according to weight for age for each AWC. The CDPO, In turn, was also trained to prepare a similar map for her project area. While the Programme Officer is expected to prepare a similar map for her district, the State Office could prepare a map for the State. Such maps would help In the identification of the areas with higher undernutrition. It would also facilitate an analysis of the causes and help to initiate appropriate action at every level. Similar maps could be prepared for the other components of the programme as well.

TRIPLE "A" APPROACH

The strategies to prevent and control malnutrition should aim at attacking the underlying immediate and basic causes simultaneously. The approach of simple assessment does not lead to decision-making and appropriate action. Identification of the problem areas and vulnerable groups. and calculation of prevalence of deficiency diseases according to the community, age and sex is essential for effective utilization of resources. Improved management of resources at all levels through better use of the available information is an important factor for the success of any Intervention. Earlier, although large data was being collected for assessment, little or no effort has been made for analysis of the causes and initiation of actions. The present Nutrition Surveillance System is based on Triple 'A' approach[5-7] at different levels, starting from the AWW to the district and State level (Fig.1). The "Triple A" approach comprises of ***assessment*** of the problem, ***analysis of the causes*** of the problem, which are programmatically manageable and implementation of resource-relevant and feasible ***action***. This is a continuous and repeated cycle of reassessment (monitoring) of the impact, improved analysis and focused action to achieve the set goals. The idea is that correct decisions are taken consciously for the *improvement of nutrition* based on sound *information*.

The system also has a built-in mechanism of feedback to provide an opportunity for appropriate action at every level and, thus, helps in the assessment of progress of nutrition and other developmental activities on a continuous basis. Such an approach could even help in targeting the developmental programmes to the needy areas.

Triple 'A' approach - Indicators

The following key indicators were identified for Triple A approach in the present system:

- Enrolment and attendance of different beneficiaries for supplementary nutrition and preschool education.
- Nutritional status of children and its trends,
- Growth faltering among children;
- Prevalence of nutritional deficiency signs like oedema (Kwashiorkor). wasting (marasmus), Bitot spots, night blindness and visible goitre.
- Coverage under national programmes namely,
  a. Immunization of children and expectant women,
  b. Vitamin 'A' distribution to children,
  c. Distribution of IFA tablets to children, pregnant woman and lactating women.
- Prevalence of low birth weight,
- Vital rates In different age and physiological groups, and
- Prevalence of common morbidity in children with causes for deaths.

REGULAR REVIEWS

The review meetings were conducted at the end of each quarter at every district headquarters. The scientists from NIN along with the representative from State Headquarters, for each project, conducted these separately. The reorientation session, usually, was of 1-2 days duration. The filled-in formats submitted by the AWWS. the reports consolidated by the Supervisors, CDPOs and Programme Officers and the tabulated data were scrutinized. The occasion of the review meeting was utilized to reorient the functionaries. During these meetings they were informed of the errors committed by them and any other shortcomings observed in their reporting, so that the functionaries could improve their performance during the next round. The review meetings and reorientation continued for a period of 12 months (4 quarters).

COMPUTERIZATION

The success of a surveillance programme depends on the regularity of submission of the quarterly reports, assessment of their completeness and correctness. Manual compilation and consolidation of the data from different AWCs/Sectors/Projects on a continuous basis is often time consuming, and is susceptible to errors. Hence, a simple user-friendly, menu- driven computer software (using *Foxpro*) has been developed to enable the concerned personnel at each project level to enter the surveillance data on Personal Computers (PC) and obtain the necessary reports for assessing the actual status and initiating appropriate action at every level. The new formats used in the project permit consolidation of the quarterly nutrition surveillance reports, rigid from the sector up to the State level. If the existing NICNET services are utilized, the quarterly surveillance reports can be made available for perusal and decision making to all the developmental agencies and the office of the District Collector. The district authorities can also utilize the information for preparation of action plan for nutrition, and for targeting and reviewing the developmental programmes regularly. However, this requires provision of PCs at every project level. The Statistical Assistant can take care of the data entry with the help of the respective sector Supervisor. The software programme developed will - facilitate consolidation of surveillance reports at sector, project, district and state level. A feedback mechanism would motivate the ICDS functionaries at different levels and facilitate initiation of appropriate action without any time

delay. The software programme will also help in the performance appraisal and remedial administrative measurers. It also helps to present the data in a graphic form for easy comprehension.

TRAINING MODULE

Since there is a proposal to establish the system of nutrition surveillance all over the country, there is a need for training functionaries of different States, based on the experiences gained with the NSS in Andhra Pradesh. The National Institute of Nutrition, along with core training learns from the respective States, can extend assistance in the training of the trainers of ICDS functionaries at State level in every State of the country. This activity can be taken up in phases depending upon the readiness of the respective State Governments to build the NSS. For this purpose, an exhaustive training module has been prepared. The module covers, in detail, topics indicated below. National Nutrition Policy, Nutrition Goals, the need for NSS, the reasons for selecting ICDS as the infrastructure for building NSS, important indicators of nutrition surveillance, organization of training programmes, and the method of conducting review meetings.

QUALITY OF REPORTING

An assessment of the quality of the reports by ICDS functionaries at various levels was undertaken for both the items already existing in the departmental MPR and for these that were incorporated in the modified quarterly formats. The quality of the data reported on enumeration was assessed by finding out whether the numbers were within the allowable range of the proportion for beneficiaries in different ages, reported for the regions in the Census, and comparing them with that of previous quarter. The correctness of the data on nutrition grades was checked by verifying whether the totals add up to the number measured. It was also validated by comparing with the data collected by the NIN investigators.

The proportion of workers reporting correctly on aspects like enumeration, births and deaths and nutritional grading of children, which were in the original MPRS, improved considerably over the 4 quarters in the case of the AWWS, the sector Supervisors and the CDPOs. At the end of March 97, it was observed that more then three fourths of all the categories of functionaries reported correctly on the aspects that were in the old formats as compared to 50% at the beginning. In the case of the aspects, which were added during the study, the correctness of reporting, at the beginning, was as low as 20% especially with regard to growth faltering, nutrition mapping and nutritional deficiency signs. This proportion increased considerably to 60 to 90% in various categories of workers.

FEASIBILITY

The very fact that the ICDS functionaries, throughout the State, and the administration controlling the scheme were totally involved and precipitated with enthusiasm in building the NSS in the State clearly demonstrated that the choice of selecting ICDS for developing the NSS was appropriate. Most of the indices of nutritional and health status could be improved through the ICDS scheme and the willingness of the functionaries to undertake the tasks also indicated that it is feasible to develop NSS for the country through the existing infrastructure. More than 60% of the functionaries at sector, project and district level submitted the reports for 3 out of 4 quarters that were followed up. About 5% of the functionaries at sector and project level failed to submit the reports, which could be due to lack of qualified and trained personnel manning AWCs/ Sectors 'Projects in the remote areas. Thus, continuous reviews at three-month intervals helped in monitoring the nutrition situation, evaluating the current status of nutrition and health programmes and providing sufficient information to initiate appropriate remedial action to improve the situation. The ICDS functionaries were able to identify the families and the areas at higher nutritional risk during the study period of one year. They were also able to identify the areas with low coverage under different national nutrition and health programmes, and was able to initiate action to improve the coverage. Improvement in the performance of various functionaries during the course of the project clearly indicates the feasibility of establishing nutritional surveillance system in the State of Andhra Pradesh.

IMPACT OF TRIPLE A APPROACH

Enrolment in Supplementary Nutrition

As per the targets, the enrolment of beneficiaries (children and women) for supplementary nutrition should not be less than 75% of the eligible. However, in some sectors, it was found that the enrolment was as low as 30% in the beginning of the project. After initiation of actions based on clear analysis, the enrolment increased, in the last quarter as compared to first quarter. The reasons for low enrolment were that: (i) the centre was located far away from the households of beneficiaries inhabiting in the hamlets, (ii) some of the children in the age group of 3-6 years taking admissions in government schools to get the benefit of mid day meal ration (rice, dhal) (iii) fixed targets given by CARE and (iv) some children, after completion of 3 years of age, getting admitted in convent schools, especially in semi urban areas.

* The anganwadi worker identified the reasons and reported to her Supervisor, who in turn, briefed the Child Development Project Officer at the project level. Some decisive actions were formulated in the project meetings and the anganwadi workers and the Supervisors initiated action for better enrolment.

Some of the corrective actions were:

* When the AWC is far away from hamlets, the ayah went to the hamlets to collect the children and bring them to AWC. The parents or elder siblings took back the children, at the time of closure of the AWC in the afternoons.

* Regarding admissions in government school. the AVM, with the help of the Supervisor or the CDPO, met the concerned Headmaster of the school and requested him not to give admissions to the beneficiaries, below the age of 6 years, belonging to the AWC.

* The mothers were explained about the Importance of supplementary nutrition and preschool education, during home visits and meetings of mothers to convince them to enrol their children in the anganwadi.

* Regarding fixed targets by CARE, ad the CDPOs discussed the matter with the Programme Officers in the district level meetings in the presence of CARE officials. The CARE personnel requested the Project Officers, to send a revised list of beneficiaries and the food stocks required, to enable them to assess the beneficiaries and food requirements for each project. Since, this process was time-consuming, no changes in the enrolment of beneficiaries were observed in some of the sectors during the study period.

Nutritional Status

In the beginning of the project, the AWW used to weigh the child and record the weight in a notebook. These were plotted on growth chart later, at her convenience. There was no interaction with the mother regarding growth of the child with the help of the chart. She usually did not assess whether there was any improvement or deterioration in the growth of the child. However, in the NSS, since growth monitoring is one of the important outcome- variables to determine the impact of programme, the AWW was given regular and appropriate orientation and training. These were repeated during the course of the study. This ensured better reporting of nutrition grading and information on growth faltering of children was also provided. Continuous review and supervision also helped. Initially, the proportion of children in grade III and IV varied between 3 and 6 percent in different sectors, which declined by about a half, at the end of the year. The main reason for widespread severe grades of undernutrition was frequent episodes of morbidity such as fever, ARI, diarrhoea among children, coupled with irregular attendance for supplementary feeding programme (SFP)

As per the prescribed criteria, under ICDS, all the children in grade III and IV of malnutrition were provided with double ration, and care was taken that the child consumed the whole supplement in the centre

itself. The mothers of those beneficiaries, who were irregular, were contacted during home visits and were explained the importance of supplementary feeding, so as to make their children avail the same regularly. Acute cases of morbidity were referred to hospital, whenever necessary.

The functionaries prepared the nutrition maps for their respective areas; the Supervisors at the sector level, the CDPOs at project level and the Programme Officers at district level. This enabled the functionaries to identify the areas with higher prevalence of grade III and IV children. The spatial distribution helped the functionaries to identify specific causes, if any, for higher prevalence of undernutrition in those areas. Thus, based on the surveillance reports, appropriate action could be initiated to reduce the prevalence. of undernutrition and promote growth in children.

Growth Faltering

Identification of children with growth faltering will be enable the worker to initiate timely action so as to prevent the child from going into severe grade of undernutrition. Actually, this aspect was not covered in the earlier monthly progress report (MPR). Initially, the percentage of reporting on growth faltering was low. In areas where irregular attendance was one of the important problem, the mothers were given education to provide proper feeding to their children by showing weight changes in the growth chart. They were encouraged to send their children to the AWC, regularly. The areas with higher percent of children with growth faltering were identified at sector and project levels. The causes for such high prevalence were discussed during the quarterly review meetings at project and district level. The Supervisors were instructed to conduct mothers' meetings along with the AWWs to educate mothers in providing knowledge about nutrition, sanitation and personal hygiene. The Supervisor were also instructed to contact the health personnel to conduct frequent health camps in areas where there was high Morbidity.

NATIONAL WORKSHOP

A two-day national workshop consisting of the Secretaries / Directors of DWCD from different States, experts in ICDS and Researchers working in Universities and Research Institutes and representatives from International Agencies like World Bank, UNICEF and CARE was conducted at the National Institute of Nutrition. Hyderabed. The workshop highlighted the need for computerisation of data for consolidation of Information at sector, project and district level. It was pointed out that nutrition and health education should receive more emphasis in the Training Module developed for the NSS. The indicators should be organised Into (i) structure. (ii) process and (iii) outcome indicators. The ***structure indicators*** include information on the status of the programmes with particular reference to organisational aspects (staff in position, number and condition of weighing scales distributed etc.). The ***Process Indicators*** are those that provide information of the processes pertaining to programmes like coverage of eligible population, input details like supplies, and regularity of providing programme components. The extent of both moderate and severe undernutrition based on weight for age; clinical signs and mortality could be used as ***outcome variables***.

CONCLUSIONS

One of the important recommendations of National Nutrition Policy is establishment of a National Nutrition Surveillance System (NSS) to identify the nutrition problems early in the at risk groups, and initiate appropriate action, so as to promote optimal nutrition The attempts of the NIN in collaboration with the DWCD, Govt. of India, to develop NSS in the State of Andhra Pradesh using ICDS infrastructure with active involvement of DWCW, Govt. of Andhra Pradesh, could be considered as successful, in view of the fact that most of the functionaries submitted QPRs of good quality regularly. The 'Triple A approach' helped the functionaries not only in analysing and understanding the reasons for malnutrition or nonparticipation in the programmes but also in initiating appropriate actions. Regular interaction with the peripheral functionaries because of NSS not only motivated them to participate in the surveillance programme but also in improving the nutrition services In general. The national workshop organized to assess the feasibility of replication of the NSS developed in Andhra Pradesh by NIN, recommended that there is a need to establish similar NSS in

other States of the country. The NIN could assist the DWCD, GOI as well as other States in training of the trainers to establish NSS in respective States. The NIN will also develop modified formats already modified) as per the recommendations of working groups to various States during the training programme. The Training Module that is developed for the purpose of NSS will also be useful to other states in organizing such a programme. The software programme could help in easy compilation of the data and carry out analysis on personal computers at the project levels.

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YOUNG SCIENTIST'S AWARDS

SENIOR AWARD

COMMUNITY NUTRITION

SACN1 **Impact of nutrition counselling on the nutritional condition of rural pregnant women.** *Asha Kumari,* Post Graduate Department of Home Science,Ranchi University, Ranchi.

Nutritional condition of rural pregnant women are very poor. Due to lack of nutritional knowledge and poor socioeconomic condition they are suffering from various nutritional deficiencies. Iron deficiency in the major problem among small pregnant women also in adolescent girls. Infant mortality rate have been brought down due to several nutrition and health interventions. Appropriate education and counselling in health and nutrition could prevent many nutritional deficiencies among pregnant women. Present study was conducted to assess the impact of nutrition counselling on the nutritional status of rural pregnant women. 100 pregnant women aged 20 to 35 yrs. Were selected from different rural areas of Ranchi town. Pregnancy outcome in terms of birth weight, maternal and fretal complications were recorded. Diet survey was a conducted in this low income group using frequency and recall method. Findings revealed that diets were inadequate in terms of energy, protein, thiamine, riboflavin, niacin, vitamin B12 and Ascorbic Acid against the RDA. Clinical assessment revealed that 75% exhibited pale nails, 62% pale tongue and 53% pale eyes. 80% women were found to be anaemia. After counselling there was a significant increase in the intake of these nutrients. A highly significant improvement in blood haemoglobin level. However, the nutrition counselling programme resulted in a highly significant fain in the nutrition knowledge, attitude and health practices score of the rural pregnant women.

SACN2 **Milk intake and growth of breast and infants during first six months.** *Mala Meghraj,* and Maya Choudhry, Department of Foods and Nutrition, College of Home Science, Maharana Pratap University of Agriculture & Technology, Udaipur, Rajasthan.

Growth of thirty breast fed infants was studied longitudinally at 10-20 days (I), 75-85 days (II) and 135-145 days (III stage) of infant, age. Healthy well nourished lactating women 20-35 years of age were Elected from hospitals of Udaipur. Breast milk consumption as estimated by deuterium dilution technique and nutrient intake as calculated from the measured concentrations of milk macro nutrients were compared with infants growth and recommended intakes of the nutrients. Breast milk intake increased from 636 g/day (I stage) to 899 g/day at III stage ($P<0.01$). The absolute amount of nutrient intake increased as lactation advanced ($P<0.01$). Each milk variable when related to infant body weight declined with increasing infant age ($P<0.01$). The consumption of energy and protein per kg body weight was adequate at all ages with recommendations. Infant growth progressed satisfactorily compared with NCHS (1977). Milk intake at all stages and fat and energy intake at I and II stages was correlated with infant growth. Multiple regression models showed that energy intake was the only factor that influenced weight gain in infants from birth weight. Results indicate that infant demand for milk and nutrients in the direct where as maternal nutritional status, breast milk output and composition are the indirect determinants of infant growth.

JUNIOR AWARD

COMMUNITY NUTRITION

JACN1 **Impact of low clarie diets on anthropometric and lipid profile of obese subjects.** *Anita B. Hanji* and Rama K. Naik, College of Rural Home Science,University of Agricultural Sciences, DHARWAD

Testing the efficacy of developed low calorie diets on obese subjects was investigated. Formulated diets varied in calorific value between 1000 to 1500 kcal, besides providing adequate protein (49-62g), carbohydrate (176-267g) and visible fat (6-12g) was provided for safety value. The efficacy was tested on the seven obese subjects for a period of one month in terms of reduction in anthropometric and biochemical parameters. Initially the subjects were instructed about the use and importance of low calorie diets and method of cooking and adherence. The impact was evidenced as an improvement in anthropometric and biochemical parameters. A significant reduction in weight (-1.5 - 4 kg), mid-upper-arm circumference (-1-4.5cm), and BMI (-1-0.68) was noticeable. However, reduction of waist to hip ratio (-0.02-0.05) was not significant. A reduction in triglyceride (-34.12 mg /dL) and in total cholesterol (-6.26mg/dL) was apparent. However the mean HDL cholesterol (+1.99 mg /dL) level was significantly increased with range of 0.98-3.15mg/dL. The VLDL-c content also showed reduction with a mean of 25.83 mg/dL. The reduction in LD-C was recorded in four subjects (-3-13.6 mg/dL).

JACN2 **Popularisation and development of a software for traditional recipes in food service.** *Thilagamani. S.* and Umamageshwari. S. Department of Food Service Management and Dietetics, Avinashilingam Deemed University, Coimbatore - 641 043.

People are influenced by fast foods like never before and hence an uprise in the prevalence of diet related disorders is seen today. The consumption of traditional recipes has slowly faded away from our diets mainly because of arduous process involved in preparation. A fusion of traditional recipes with modern preparation and presentation can bring back the novelty and variety expected in the present day by using locally available nutritious foods. Hence the present study has been undertaken to popularise the traditional recipes in food service operations, thereby an awareness can be created in the community to include them in our regular diets. 75 traditional recipes were collected from housewives and cooks catering to religious functions and marriages at Coimbatore using an interview schedule. 50 recipes namely ten main dishes, seven lunch / dinner accompaniments, six savouries, 22 sweets and five desserts were standardised. A software was developed using Visual Basic with details of the recipes and their nutritive value. 15 standardised recipes were introduced in a commercial and 5 recipes in a non commercial food service. The recipes introduced were followed in the routine menu of the food service. A total of 2470 customers evaluated the traditional recipes using scorecards. The evaluation showed 87 percent of overall acceptability for the traditional recipes, highlighting the tremendous popularity these recipes have.

JACN3 **Evaluation of food servie and foods served in selected orphanages, destitute homes and homes for Senior Citizens.** *Dorothy Jaganathan* and Deepa M., Department of Food Service Management and Dietetics, Avinashilingam Deemed University, Coimbatore - 641 043.

The food service industry is complex, fast growing and ever changing. One of the most challenging tasks for the welfare catering institutions is to meet the demands and requirements of the inmates. The present

study was conducted in the selected eleven welfare catering institutions in Salem and Coimbatore districts to know the functioning of food service and to strengthen the food service therein. The findings revealed that the majority of the inmates were satisfied with the service offered. It is essential that in these establishments, the nutritional balance of food is considered and it should satisfy all the residents nutritional needs, as in all probability, the people eating here will have no other food. The intake of calorie, protein, iron and fibre were deficit than the recommended dietary allowance. The sanitation and hygiene practices were good in all areas except in the handwashing area. The areas requiring improvements were identified and the inputs emphasised in all selected institutions. Menu planning, standardization of recipes and portion control, service of food, minimization of wastage, utilization of left over, sanitation and hygiene, garbage disposal and nutrition education.

JACN4 **Immunocompetence and Hypocholesterolemic potentials of Tinospora cordifolia and Eclipta alba on post menopausal women,** *S. Haripriya* and Usha Chandrasekhar, Department of Food Science and nutrition, Avinashilingam University, Coimbatore 641043.

Menopause is of increasing importance to the health professionals in terms of both preventive and clinical care of women in their later years of life. With increase in life expectancy the average woman now lives approximately one third of her life in postmenopausal period. Several irritable symptoms attributed to menopause are often encountered during this later years in life and freedom from related symptoms and comfort could add life to years. Lowering of Immunocompetence and hypocholesterolemic are two of the identified symptoms in postmenopausal women and the main aim of the present study was to evaluate the immunocompetence and hypocholesterolemic potentials of Tinospora cordifolia and Eclipta alba respectively in post menopausal women. A group of 400 postmenopausal women were selected and divided into two groups A and B of 200 women each. In both groups 100 women served as the experimental group and the remaining 100 women served as the control. The experimental group A consisted of postmenopausal women with low Immunocompetence and was treated with 525 mg/day of Tinospora cordifolia. Experimental group B consisted of postmenopausal women with hypocholesterolemia and hence were treated with 750 mg/day of Eclipta alba. The control groups were placed on placebo treatment. The impact was studied in terms of weight changes and biochemical parameters representing the symptoms in question over a period of six months. Findings as related to Immunocompetence and hypocholesterolemia revealed that Tinospora cordifolia and Eclipta alba proved to be an excellent immuno-modulator and hypocholesterolemic agent respectively.

JACN5 **Nutritional profile of mother infant pair during first six weeks of lactation.** *Shalini sharma* and Maya Choudhry. Department of Food and Nutrition. College of Home Science, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan.

Nutritional profile of thirty mother infant pair from government hospital Udaipur, Rajasthan was studied semi longitudinally during first six weeks of lactation. Results revealed that diet of the women was adequate or more than adequate in all the food except cereals (40-60%) when compared with balanced diet. Intake of all the nutrients except calcium (66%), niacin (59%) and vitamin C (21%) was as per the RDA. Traditional supplementary foods were providing 2% of potassium to 41 % of zinc in daily diet. Weight of the women and BMI ranged from 51.33 kg. & 21.32 (week I) to 52.62 kg & 21.86 (week VI) indicating normal nutritional status. Skinfolds increased at all the sites with the advancement of lactation. Body fat, fat free mass and body water were 14.30 - 15.73 kg., 36.87-37.04 kg. And 26.99-27.1 kg respectively during first to six weeks. The increase in body measurements, component and food & nutrient intake during six weeks was non significant ($P>0.05$). Weight and length of infants increased significantly ($P<0.01$) during the study period and were more than 90% of NCHS standards. Normal nutritional status of mothers as well as infant along with breast feeding emphasizes the importance of traditional supplementary foods in daily diets of lactating mothers.

JACN6 **Reproducibility and validity of food frequency Questionnaire in an Urban and Rural area: The Indian Context.** *Priyali Pathak,* Ritu Pradhan, Umesh Kapil, Sada Nand Dwivedi, Preeti Singh. Department of Human Nutrition, All India Institute of Medical Sciences, Ansari Nagar, New Delhi - 110 029.

The food frequency method is being increasingly recognized as a suitable tool in epidemiological studies where evidence is sought for an association of diet in general rather than with specific nutrients. Concern has been raised about the reproducibility and validity of the dietary data reported from food frequency method. No study has been undertaken to assess the reproducibility and validity of the food frequency methodology in India. The present study was aimed at assessing the reproducibility and ,validity of the food frequency questionnaire methodology in the Urban and Rural Areas of India. The study was undertaken in an urban and rural area of India. Urban areas included southern areas of New Delhi. Rural area comprised of Block Kanina, District Mahindergargh Haryana. The study was undertaken in two Phases. The Phase I data was collected utilizing a semistructured protested questionnaire of Food Frequency and the 24 hour dietary recall method amongst 200 and 240 subjects from the urban and rural areas, respectively. The Phase II of data collection was undertaken after 12 months of collection of Phase I data amongst 169 and 212 subjects of the urban and rural areas, respectively. These 381 subjects were administered the questionnaires in both the Phases. The reproducibility and validity of the food frequency questionnaire methodology was assessed by calculating percent agreement between Phase I and Phase II data utilizing standard statistical tests. Results revealed that there was a perfect agreement for the reproducibility and validity for the food group cereals in the Urban and Rural areas. All the other food groups had a very good or good agreement for the reproducibility and validity for the Food Frequency Questionnaire. No food group had an agreement as poor agreement. The Food Frequency Questionnaire methodology is a reproducible and valid tool for dietary intake assessment in the Urban and Rural areas in the Indian context.

JACN7 **A study of knowledge, attitude and practice of men in the age group of 30-60 years in Jaipur city regarding coronary heart diseases.** *Hina Khan* and Reshma Boolchandani, Foods and Nutrition Department of Home Science, University of Rajasthan, Jaipur.

An investigation was carried out to study the extent of knowledge, attitude and practices regarding CHD among businessmen. For this purpose business men in the age group of 30-60 years from M.I.Road of Jaipur city were interviewed with the help of a structured presented questionnaire. The results indicate that there is an insignificant relationship between knowledge and risk factors of CHD such as smoking, alcoholism, weight gain, BMI, and WHR. (X^2= 0.429866, 3.01696, 1.92598, 1.94, 2.216) Although many of them lack awareness regarding the normal level of glucose, blood pressure. The overall scores for attitude was very high. The study also indicate that there is an insignificant relationship between attitude and alcoholism, weight gain, BMI and WHR (X^2=0.54037, 7.05197, 13.20355, 5.6650) But a gap was found between knowledge, attitude and practices regarding diet, life style and other risk factors for CHD (specially exercise, consumption of foods, smoking, alcoholism, WHR, BMI, weight gain etc.) in difference age groups.. Need of hour is to make people aware and inform about CHD risk factors to each and every layman of our country. And ensure them to follow good dietary and living habits to prevent CHD.

EXPERIMENTAL NUTRITION

JAEN1 **Effect of food based antioxidants on the antioxidant status and blood glucose levels in non-insulin dependent**. *K. Krishnapriya*, Usha Chandrasekhar and S. Kowsalya, Avinashilingam University, Coimbatore - 641 043.

An investigation was carried out to study the comparative efficacy of food based antioxidants over tablet antioxidants on the blood glucose levels and antioxidant levels in moderate NIDDM subjects. A total of 17 subjects received dietary food supplements comprising of *Amaranthus gangeticus, 100g;* amla powder, 10g; wheat germ, 10g, and sweet lime, 1 in no, another 17 received antioxidant capsules namely GLACE and 20 subjects formed the control group. Results indicated that the serum antioxidant status and the blood biochemical status significantly improved in both the food supplemented group and the tablet supplemented group over a period of two and a half months, while the control group did not show any improvement. Food supplements proved to be better in improving the haemoglobin status and equally effective to tablets in reducing the blood sugar levels and elevating the plasma antioxidant levels of vitamin C, vitamin E, selenium and copper. Tablets gave a slightly better improvement in the serum vitamin A and zinc status. These observations point out that antioxidant supplementation in the food form, a natural practicable aspect of dietary management of diabetes, when followed on a day to day basis is no doubt the answer to alleviate oxidative stress and keep the diabetic status and complications under control.

JAEN2 **Comparison of Hemocue method with Cyanmethemoglobin method for estimation of Hemoglobin.** *Singh P.,* Pathak P., Kapoor S.K., Kapil U. Department of Human Nutrition, All India Institute of Medical Sciences, Ansari Nagar, New Delhi - 110 029.

Iron deficiency anemia is an important public health problem resulting in considerate morbidity and mortality. Estimating the prevalence of anemia depends upon the methods used for assessing hemoglobin concentration and the cut off point applied. The present study was undertaken to compare the results of hemoglobin estimation obtained by HemoCue method against cyanmethemoglobin method in capillary and venous blood samples. The study was conducted in phases. In Phase I, a total of 151 capillary blood samples were obtained and the hemoglobin values obtained by the HemoCue method were compared with the cyanmethemoglobin method. In Phase II, a total of 335 venous blood samples were obtained and the hemoglobin values obtained by the HemoCue method were compared with the cyanmethemoglobin method as per the recommended procedure. It was found that for all degrees of anemia HemoCue overestimated the hemoglobin levels as compared to the cyanmethemoglobin method in both capillary and venous blood samples. Cyanmethemoglobin method provides correct values of hemoglobin while hemocue does not. Hence, for research studies cyanmethemoglobin method should be used to provide accurate results. In areas where cyanmethemoglobin method cannot be used, hemoCue should be used by applying correction factor of -1.5 and -1.3 in capillary and venous blood samples, respectively.

JAEN3 **Linkages of antioxidant status with the degree of oxidative stress & opacity of lens in Indian Cataract Patients.** *Kirtan Torwadi* and Vaishali Agte., Biometery and Nutrition Group, Agharkar Research Institute, G.G. Agarkar Road, Pune - 411 004.

Altered equilibrium between oxidants and antioxidants is the main feature of human and experimental cataract which is the most important Cause of visual disability. According to recent reports, Indians have higher prevalence rates of soft cataract with approximately 4 million people becoming blind by advanced or mature cataract. Status of antioxidant metals and oxidative stress in plasma and extracted lens was as-

sessed for 80 cataract patients and in plasma, for 40 age-sex matched controls. Ratio of soluble to tota proteins (S:T ratio) and turbidity of the lens homogenate as O.D. at 550 nm were taken as measures of lens opacity. The order of oxidative stress as MDA equivalents in plasma for cataract patients was HIG women > LIG women > LIG men > HIG men > control men and women. The lens turbidity was associated with serum ceruloplasmin (r, -0.407, $p < 0.05$). MDA and S:T ratio in lens were highly of selenium in plasma were correlated with the S:T ratio (r, -0.363, $p < 0.05$) while the associations with lens zinc were significant for turbidity of lens (r, 0.24 $p < 0.05$) The patients as well as control had low levels hemoglobin (11.1-13.3 g%) and ceruloplasmin (19-23 U/L). Cataract patients had significantly ($p < 0.05$) lower levels of ceruloplasmin than the controls (16.8 VS. 23.9 U/litre). Levels of lens zinc (12.04 ppm) were comparable and that of copper (1.13) were higher than the reported values by Sethi etal (1989).

FREE COMMUNICATIONS

ORAL PRESENTATION

COMMUNITY NUTRITION

OPCN1 **Nutritional status of the women in pre and post menopausal stage, of the Bikaner City (Raj.)**
Divya Kuvera and Vimla Dhukwal, College of Home Science, Rajasthan Agricultural University, Bikaner.

The study was conducted on 200 women subjects of Bikaner city. The women subjects falling in the age range of 40-45 years, having regular menstrual cycle were selected as premenopausal subjects. Subjects in the age range of 50-55 years, having no menstrual cycle from atleast 6 consecutive months, were selected as postmenopausal subjects. The results of the present study revealed that mean intake of the nutrients, in postmenopausal group was below the recommended dietary allowances (ICMR, 1992) as well as lower than mean intake by premenopausal group. The incidence of hypertension was more prevalent in the subjects after menopause. Various menopausal symptoms related to cardiovascular, neurotic and psychotic, endocrine and gastrointestinal problems were found to be common (more than twice) in postmenopausal subjects as compared to premenopausal subjects. Results regarding biochemical assessment showed, that majority of the subjects after menopause were suffering from moderate degree of anaemia. Postmenopausal group was at borderline risk of diabetes mellitus and cardiovascular diseases. The serum calcium level in post group was significantly higher than normal values due to low intake of calcium in diet, which indicates the high risk for osteoporosis.

OPCN2 **Nutritional status of rural pregnant women and It's impact on new born babies.** *Jayshree Godse**, Nuzat Sultana**, * Head P.G. Dept. of H.Sc., Govt. College of Arts & Sci. and **Head of H.Sc. Dept., K.S.K. College Beed.

Two hundred rural pregnant women, aged between 18 to 35 years were selected randomly from Georie and Beed district. Nutritional status of these pregnant women was assessed by anthropometric, biochemical and clinical methods. The experimental group (i.e. A & B) received supplementation of B_{12} & B_6 and folic acid, whereas group 'C' was treated as control group. All the anthropometric measurement were taken before and after supplementation. The result showed that there is significant increase in weight, abdominal and chest & mid arm circumference of experimental group, but there is no increment in control group sample.

In biochemical estimation according to WHO the Hb level of the rural pregnant women were very low and most of them were anaemic. But after supplementation the Hb level of experimental sample were increased significantly as against the control group. Most of the clinical symptoms were prevalent in experimental before supplementation but it disappeared soon after supplementation. In the present study the trend in the anthropometric measurements of the infants of supplemented A & B mothers recorded higher length, weight, chest circumference and mid arm circumference as against the control group 'C'. Thus it seem that the nutritional status of the pregnant women is likely to affect the anthropometric measurements of the new born.

OPCN3 **Role of micronutrients during fetal adaptation in determining birth outcome.** *Sadhana Joshi,* Subhash Girigosavi and Shobha Rao, Biometry and Nutrition Group, Agharkar Research, Institute, Pune 411 004

The 'fetal origin' hypothesis which proposes that undernutrition during fetal life programmes for adult degenerative diseases is now debated worldwide. There is however limited information available on the role of micronutrients during such adaptations. Present study reports, effect of supplementation of folic acid and

w-3 fatty acids at lower level of protein intake during pregnancy on birth outcome. Wistar albino rats were fed 18% (control) casein diet from day 22 of life were given a) control diet b) 12% protein supplemented with 8 mg folic acid c) 12% protein deficient in folic acid d) 12% protein supplemented with fish oil during pregnancy and switched to control diet during lactation. No significant difference in feed intake was observed among various groups. Weight gain during pregnancy was significantly ($p<0.01$) higher in folic acid supplemented group (105.72± 9.06) as compared to deficient group (92.80 ± 9.12). Folic acid supplemented pups had higher birthweight (5.35 ± 0.48) vs 5.21 ± 0.49) and showed significant improvement in weight ($p<0.01$) and length ($p<0.01$) at 7,14 and 21d and showed results similar to control pups. With regard to fish oil supplementation weight gain of animals in the fish oil supplemented group (101.90 ± 4.48) was lower than control group (117.38 ± 11.53). Although the birthweight of the offspring's was lower in the supplemented group the pups showed a rapid catch-up in weight at 7,14 and 21d. Results suggest that folic acid and w-3 fatty acid play important role in foetal adaptation to improving birth size.

OPCN4 **Impact of individual and group counselling interventions on blood sugar and lipid profile of NIDDM subjects.** *Usha Malagi* and Rama Naik, College of Rural Home Science, University of Agricultural Sciences, Dharwad.

The impact of diet and educational intervention on the management of diabetes mellitus was studied. About 26 diabetics were given intervention in form of diet modification (I) for individual diabetics, education systematically planned and programmed (II) in form of individual, group, family and spouse education and combination of I and II (III), with 6-7 diabetics in each group. A control group was maintained without any interventions (IV). The blood sugar and lipids were analysed using diagnostic kits in the beginning, and at 2 month intervals till the end of study. A steady and significant decrease in the mean FBS (155.70 to 99.65 mg/dl) and PPBS (230.80 to 193.55 mg/dl), lipids viz., total cholesterol (206 to 178.70 mg/dl), LDL-C (129.27 to 106.24 mg/dl) and T.G (186.80 to 146.55 mg/dl) and increase in HDL-C (39.45 to 41.40 mg/dl) was observed at the end of study. All the three interventions were found to be effective in controlling blood sugar and lipids. Diet modification intervention was most effective followed by education and the combination of the two.

OPCN5 **Nurtitional problems of Banjara mothers and children.** *Asha Deshmukh* and Asha Mane. Ane Mahila Mahavidyalaya and Department of Home-Science, Amravati University, Amravati (M.S)

Yavatmal district of Maharashtra is known for dense population of Banjara tribe. This nomadic tribe has its own and unique food habits. Need, therefore was realised to study the nutrition of this vulnerable section of the society, particularly of mothers and children, since they are the precious human resources. A sample of 200 mothers, 200 children 1-3 yrs. age was selected with 'N'th method. Information regarding nutritional parameters was collected. It was revealed that most of the women and children respondents were under-weight, anaemic and suffering from vitamin B complex deficiency and dermatitis. Their consumption of cereal, animal food, fats and oils was marginal where as consumption of vegetables, fruits and milk was inadequate. The diets were adequate in protein, thiamine and niacin but marginally adequate in energy, iron, vitamin A and folic acid, deficient in calcium and riboflavin and grossly deficient in vitamin A and C. Thus the percentage adequacy for food and nutrition was far from ICMR standards, indicated thereby undesirable and unsatisfac-tory nutritional status. It was observed that importance of mother health was not recognised at all. Hence systematic planning and comprehensive research study is needed to be directed to understand problems and to decide nutrition strategy especially for mothers and children.

OPCN6 **Buckwheat (Fagopyron spp.) A nutraceutical pseudo-cereal crop of high promise.** *M.W. Chitale*, U.S. Saiyam*, S.Chitale, College of Agriculture, IGAU, Raipur (C.G.), * Joint Director Agriculture, Bilaspur (C.G.)

Numerous life support plant species are grown by tribals and people living in the hilly area, who sustain on such plants and derive their livelihood. These plant species are used for healthy oil, nutraceutical value and as herb in Indian and Chinese system of medicine. Agronomically such crop species are grouped as under utilized crops (UC) restricted to special environment, have small area and low production. Buckwheat (BW) is an important UC; a pseudocereal with nutraceutical value. The origin of BW is located in Himalayan mountain range at 400-4200 m altitude in India, Bhutan and Southern Tibet. Migration of this crop to north central hills of Mainpat areas in Ambikapur of Surguja district in Chhattisgarh state (CG) is surprising. It might be introduced by Tibetan people rehabilitated there or tribal inhabitants of Mainpat area. Mainpat is situated at altitude of 1150 msl have min. temperature of 8.0 ^{0}C in December-January and 10.5^{0}C during November-February favourable to BW crop. Present paper is addressed to access possibilities of BW cultivation in the plains of Raipur (C.G.) situated at 300 msl, with min. temperature of Dec.-Jan. 10.6 ^{0}C and Nov.-Dec. 14.6^{0}C, 13.2 ^{0}C which are higher than of Ambikapur for same months. Findings from BW experiment with two fertility levels and two planting distances conducted in two winter seasons of year 1999 and 2000 at Research Farm, Agriculture College, Raipur (C.G.) infers that crop can be grown successfully in plains. Higher dose of Nitrogen 40 kg N ha^{-1} gave 475 kg^{-ha} and closer distance of 30 cm between rows on 487 kg^{-ha} grain yield. Life span of BW is 85 days. Crop matures in February if sown in November. Seed set and ripening in BW crop is highly correlated with degree days. BW plant attained height of 109.1 cm and 157 seeds plant-1 and unit seed weight of 2.125g/ 100 seeds. Grain yield is near world range 500-1100 kg^{-ha} reported in literature. BW grain flour is used for Soba noodles in Japan, pancake mixes, ice-cream cones. BW is used as ethanic food in India. Nutraceutical nourishing meals of BW have good shelf life. BW is used in preventive high blood pressure, intestine relief, inflammation, bleeding nose etc. BW has good protein profile of lysine. Starch is major constituent of BW carbohydrate. BW flower bloom gives good quality nectar used for bee keeping and honey making.

OPCN7 **Comparative knowledge about basic nutrition among urban, rural and tribal AWWS and beneficiary mothers,** *Anita Joshi* and Munira M. Husain, Govt. New Girls Post Graduate College, Kila Maidan, Indore (M.P.)

60 Anganwadi workers, 20-20 each from Urban (Indore), Rural (Sanwer) and Tribal (Dhar) areas of ICDS were selected randomly and 480 beneficiary mother (carrying <2 years old child), 8-8 each per AWW respectively were selected by random purposive sampling, were asked some questions regarding basic nutrition. The 'F' value of the mean scores obtained by different groups is 111.66, which is significant at 1% level. The multiple range 't' tests revealed that the Urban AWWs secured maximum mean score, 0.83 (0.36), while the tribal mothers obtained least mean score, 0.26 (0.44) out of the total mean of one mark. The score of urban mother and rural AWWs are not significantly different. Remaining all other groups have scored significantly different mean scores from each other. In all individual nine questions that is asked about basic nutrition, urban AWWs and beneficiary mothers secured maximum marks among their respective groups. In the questions related to nutritional requirements of growing children, source of energy in child diet, protein rich foods, importance of calcium and vitamin D, iodine deficiency disease, benefits of sunrays and consequence of iron deficiency, rural group scored slightly less than urban group. In question about uses of yellow green vegetable.

OPCN8 **Nutritional status of women and preschool children in urban slums of Delhi - A profile.** *Sarath Gopalan,* Shailee Saran, Kanti Prasad and Promila Gahlot, Nutrition Foundation of India, New Delhi.

Urbanization has inevitably resulted in the proliferation of urban slums. Slum population living in adverse conditions represents nutritionally vulnerable groups that need immediate attention. The study presents a picture of the nutritional status of women in the reproductive age (18-45 years, n=192) and preschool children (2-5 years, n=100) residing in urban slums of Delhi attending the 'Diet Counselling Unit' of the Institute.

The study reveals that only 52% of women had BMI levels which may be considered normal (18.5-25), 42% had BMI levels (<18.5) indicative of Chronic Energy Deficiency (CED) and only 6% had BMI levels (>25) indicative of overweight and obesity. The prevalence of mild (17.5-18.5), moderate (16-17.5) and severe (<16) grades of CED were 26%, 6% and 10% respectively. Sixteen percent of women were below 145 cm, which is indicative of possibility of obstetric risks, and of deliveries of LBW babies. Nearly 89% women had some degree of anaemia. Fifty six percent of these were mildly anaemic (10-11.9g/dl), 30% moderately anaemic (7.9-9g/dl) and 3% severely anaemic (<7g/dl). The mean intake of calories in women was found to be 1075 ± 403.85 Kcal and that of protein was 30.16 ± 12.39g. With respect to Blood pressure (BP), the mean systolic pressure was found to be 112.97 ± 13.60 and the mean diastolic pressure was 70.63 ± 8.18. Only 5% were noted to be hypertensive. A positive correlation was observed between age, BMI, BP and weight ($p<0.01$). The data not only reflects the poor nutritional status of women but also that these women could beget babies of low birth weight who would end up as stunted adults, thereby perpetuating a vicious intergenerational cycle of undernutrition.

Out of 100 preschool children (57% boys and 43% girls), 74 children were found to be underweight (weight-for-age< -2SD), 63% were stunted (Height-for-age <-2SD) and 19% showed wasting (weight-for-height <-2SD). The morbidity profile (week prior to date of data recording) showed a prevalence of diarrhoea (12%), fever (8%) and respiratory problems (12%).

The rural to urban migration of the population within the country may involve significant changes in lifestyle and socioeconomic status. The analysis presented here attempts to help in planning strategies aimed at both prevention and intervention in combating the problem of undernutrition in urban slums in India.

OPCN9 **Development of an audiovisual package on NIDDM with special reference to disease and diet.** *A.K. Sankhla,* Aarti Sankhla and Vineeta Kothari, Dept. of Dairy and Food Chemistry College of Dairy and Food Science Technology, MPUAT, Udaipur.

Realising the need for extending knowledge to its beneficiaries, it was thought pertinent to develop an educational package on diabetes. The entire information was gathered and organised in three major components via. (1) general facts about diabetes, (2) etiology clinical manifestations and associated clinical complications and (3) management of NIDDM. Component wise detailed text and its suitability for Indian population were worked out. The material was then orderly arranged to maintain continuity. This script was further edited in light of suggestions made by subject matter specialists. Thirty minute video cassette of this script was prepared by recording both audio and video script simultaneously. Video examples were inserted at suitable places with the help of electronic digital mixer. Required titles and captions were framed and inserted suitably in well edited and scene wise sequentially arranged casette.Fifteen numbers including nutritionists, doctors and NIDDM patients were asked to evaluate it on the basis of pertinent parameters using five point rating scale. With a range of 4.4 to 4.86 points, the prepared aid was rated as credible, well balanced and had good organizational quality.

OPCN10 **Diet and heart - The latest concept.** *Dr. Anupam Shrivastava*, Diplomate in Cardiology - SASMS. New Delhi.

Widespread use of unsaturated fatty acids, as present days vegetable oils, are claimed to be health hazardous & are now well known to increase the incidence of not only HEART DISEASES but of DIABETES MELLITUS & some CANCERS also. There has been a rapid rise in the occurrence of heart & other related disease. This higher incidence followed the wide use of fats during last two decades.

Unsaturated fats are a potent source of Reactive Oxy-radicals to induce oxidative stress. Ill-balanced high intake of n:6 fat deranges essential fatty acid metabolism to promote Thrombo-genic, Athero-genic & vaso-spastic disorders, which further increase incidence of not only heart diseases & but acute episodes as heart attack also. Free use of processed, preserved & refined foods depleted in natural anti oxidants is not capable of preventing the oxidative damage leading to heart diseases. Evidences available to support that increase in high incidence of heart diseases due to athero-sclerosis is not mainly due to saturated fats or dietary cholesterol, as propogated earlier.

Similarly, if we will not be careful in nutritional care of heart patients, this also leads to further worsening of existing disease & may be responsible for poor quality of life & other complications including increased mortality. In addition to fats, role of other nutrients like electrolytes as Sodium is also important in patients of Hypertension, CCF & other Heart Diseases.

Better aspect is that, correction of faulty fat & nutritional defects reverses the disease process in early stage but for late stages simultaneous care of Cardiologist is also required.

EXPERIMENTAL NUTRITION

OPEN 1 **Efficacy of 4 months daily Zinc supplementation on lower respiratory tract infections diarrhoea and cognition in children 6-30 month of age; A randomized double blind trial in an Urban Slum Community,** *Sunita Taneja***, *Nita* Bhandari**, Rajiv Bahl**, Tor Strand*, Kare Molbak***, Halvor Sommerfelt*, Maharaj K. Bhan**, *Centre For International Health, *University Of Bergen, Bergen, Norway ***Statens Serum Institute, Copenhagen S, Denmark. **All India Institute Of Medical Sciences, New Delhi, India

Zinc deficiency is common in developing countries. Improving zinc intakes in deficient children substantially reduces the incidence and prevalence of childhood diarrhoea; the impact on lower respiratory tract infections is still uncertain. This study examined the impact of zinc supplementation on incidence of all and severe diarrhoea and respiratory tract infections.

An urban slum in Delhi, India; 2482 children aged 6-30 months were administered zinc gluconate (10 mg/d to infants and 20 mg/d to older children) or placebo syrup daily for 4 months and day wise morbidity data ascertained through weekly home visits. Children with cough and high respiratory rates or lower chest indrawing were referred to physicians who followed them up till recovery. Mental and motor development scores were assessed at enrollment and 4 months after supplementation using the Bayley Scales of Infant Development.

Children in the two groups were comparable for a number of socioeconomic, child and family characteristics at baseline. The mean plasma zinc was significantly higher in the zinc group at end study [129.1(SD

66.3) vs 60.8 (SD 13.8)ug/dL,p<0.001]. There was no reduction in ALRI incidence in the zinc group (Rate Ratio 1.0,95% CI 0.89 to 1.12). Zinc. supplementation resulted in a 27% reduction in the incidence of pneumonia (Rate Ratio 0.73,95% CI 0.55 to 0.96). The incidence rate of diarrhoea was lower in the zinc supplemented children (Rate Ratio 0.90 95% CI 0.85 to 0.94).

The incidence rate of persistent diarrhoea was 23% lower for episodes lasting 7-13d (Rate Ratio 0.79,95% CI O.66 to 0.93) and 33% (Rate Ratio 0.67,95% CI 0.47 to 0.95) for duration ≥ 14 days. The incidence of diarrhoea with high stool frequency of ≥ 10 episodes/day was 23% lower (Rate Ratio 0.77,95% CI 0.65 to 0.91) in the zinc group children.

In the child based analysis 49% less children (95% CI 35% to 74%) suffered recurrent diarrhoea defined as 6 or more diarrheal episodes during the study period than those given placebo. Data on impact of supplementation on motor and mental development of children aged 12-18 months are under analysis and will be presented. The mean copper levels were significantly lower in the zinc group children (difference in means - 15.5 µg/dl,95% CI - 19.8 to -11.1) and 4.8% children had levels <80 µg/dL compared to 0.6% in the placebo group. Zinc supplementation resulted in a significant reduction in pneumonia and diarrhoea. The fact that the impact was on severe morbidity has greater public health significance. Interventions to improve zinc intake should receive priority in such settings.

OPEN2 **Development and proximate principles of instant rab mix.** *Renu Mogra* and Maya Choudhry, Deptt. of Foods and Nutrition, College of Home Science, M.P. University of Agriculture and Technology, Udaipur.

Rab, a traditional preparation of Rajasthan, is salty, thick soup like in consistency and have rich mouthful characteristic. It is prepared by boiling maize grits and / or flour in buttermilk. The traditional method of preparation is a long drawn process with low shelf life. Hence, an attempt has been made to develop an instant rab mix. To develop an instant mix, curd having 1% acidity as lactic acid was standardised using different pure cultures for the preparations of butter milk. Maize flour of mesh size 150 microns was used for preparing rab as per traditional method. Rab was solar dried, powdered and could be reconstituted as rab when boiled in plain water for eight minutes. Mean acceptability scores of rab ranged from 7-8 scores for different organoleptic characteristics on nine point hedonic scale. Proximate composition of instant rab mix was moisture 4.15g, Protein 15.86g, Fat 6.44g, Carbohydrate 67.34g, Fibre 1.75g, Ash 3.31g and Energy 295.80 Kcal per 100g. Thus, it could be said that the rab mix developed is nutritious, acceptable, reconstituted within few minutes and can be consumed by all age groups.

OPEN 3 **Value added products based on sangari *(Prosopis cineraria)*.** *Anjula Swami** & Madhu Goyal**, Department of Foods & Nurition, College of Home Science, Rajasthan Agricultural University, Bilkaner (RAJ)*P.G. Student,Deptt. Of Foods & Nutrition,College of Home Science, RAU,Bikaner(Raj.)
** Associate Proffesor, Head, Deptt. of Food & Nutrition College of Home Science,RAU,Bikaner (Raj.)

During the month of April-May fresh sangari (*Prosopis cineraria*) is available either free of cost or at very low prices to the people of arid region (Raj.). Therefore a study was undertaken to improve the quality of certain basic recipes consumed by residents of Bikaner (Raj) by incorporating sangari. To find out sangari consumption pattern, a community survey was conducted. On basis of results of community surveys and experimental possibilities thirteen different products based on fresh and dried sangari were developed. The standardized sangari products were found to be sangari vegetable, plain sangari pickle, sangari pickle with ker, sangari pickle with green mango and sangari stuffed parantha scoring 3.88 to 4.54 on five point scale.

Whereas standardized products of dried sangari scored 4.24 to 4.89 scores for their overall mean acceptability. Products like *mathari*, sweet biscuit, salty biscuit, *laddoo* and *kasar* were prepared with the addition of 20% sangari powder to the basic recipies. Dried sangari was also used for preparing *punchkuta, kadi* and fried sangari. Addition of sangari to various basic recipies considerably improved the nutritive value of the products with special reference to protein (8.2 to 200%) & crude fibre (7.1 to 600%).

OPEN4 **Effects of undernutrition during pregnancy/lactation on vital organs at different ages in rats.**
*Sathyam Nayak,*Sadhana Joshi, Varsha Garole, Mahadeo Daware and Shobha Rao. Biometry and Nutrition Group, Agharkar Research Institute, Pune 411 004, India.

Recent studies have emphasized the association of suboptimal maternal nutrition in pregnancy with increased risk for adult diseases. The effects of fetal adaptations may be modified due to post natal experiences. Present study reports effects of nutritional rehabilitation and dehabilitation on heart, brain, liver, kidney and pancreas of the progeny at 90,180 and 270d of age. Two groups of female rats were fed cereal-pulse based diets giving 18% and 9% protein till delivery and then cross over of diets for the mothers was done from the day of delivery resulting in four groups. C - control (18% protein throughout life) : D - dehabilitated (18% protein in utero and 9% from birth); R - rehabilitated (9% protein in utero and 18% from birth); Ch - chronic (9% protein throughout life). Brain and heart sparing was seen at all ages for both sexes. Relative weight of liver was significantly ($p<0.05$) affected in males at 270d in D group despite good nutrition during pregnancy and in R group inspite of rapid catch up growth. Similarly kidney was affected in both sexes at all ages in D and Ch group. However relative weights of pancreas at 270d were lower though not significant in R and Ch group females. Results thus indicate prominent effects of postnatal rehabilitation and dehabilitation mainly on liver and kidney and are likely to increase risks for adult diseases.

OPEN5 **Impact of administration of antioxidant vitamins A,E and C on the lipid profile of cigarette smokers** *P. Parvati Easwaran,* S.Sangeetha and Alamelu Mangai.S., Department of Food Service Management and Dietetics Avinashilingam Institute for Home Science and Higher Education for Women (Deemed University) Coimbatore, India

Tobacco consumption is one of the potent predisposing factors for a number of chronic diet related degenerative diseases which kill 3-5 million people today with 70% of the people in the developing world. Smoking is associated with adverse changes in lipids as oxides of nitrogen oxidize low-density lipoproteins. The beneficial role of antioxidants on lipid profile alterations is being studied by research workers. In the present research a total of 500 adult male employees of an industrial undertaking of the Government of India, were surveyed for background information and lifestyle pattern to identify the smokers and quitters of smoking. Fifty-four smokers and six quitters of smoking with abnormal lipid profile were identified. The larger adults were divided into ten groups of six each. Groups I to IX served as experimental groups and group X as control. The experimental design included administration of vitamins A, E and C through food sources including sweet limejuice, raw carrot and almonds contributing 100 mg of ascorbic acid, 1500µg of beta-carotene and 1mg of vitamin E per day . Synthetic preparations of the lowest dosage of the antioxidants namely 1500 µg of beta-carotene, 100 mg of ascorbic acid and 100 mg of vitamin E available in the pharmaceutical market were used. The vitamin E contribution of the food supplement could not match with that of the synthetic form. Lipid profile in terms of total cholesterol, LDL, VLDL and HDL Cholesterol and Triglycerides was assessed at the beginning and end of the study period of 31 days. The administration of antioxidant vitamins A,E and C through synthetic forms and food sources did not bring about significant alterations in the lipid fractions, while on the quitters, antioxidant vitamins A,E and C through food sources effected significant reduction at five percent level in Total Cholesterol, LDL Cholesterol and Triglycerides. The present study gives a take home message

to adult males that "Cessation of smoking nullifies the ill effects of smoking with dietary focus on adequate consumption of vegetables and fruits every day". Quit Smoking' is probably another strong message to be imbibed by adult males.

OPEN 6 **Knowledge attitude and practices regarding diet, lifestyle and risk factors in CAD patients.** *Richa Chaturvedi* and Nimali Singh, P.G. Department of Home Science, University of Rajasthan, Jaipurr.

Cardiovascular diseases are the growing epidemic in all countries of the world. Indian community has been proved to be at risk, population for the disease. The casual factors of this are acculturation, urbanisation, increasing affluence, westernised life-style and dietary habits. The present study was carried out to assess knowledge, attitudes and practices regarding diet, life style and risk factors in patients (30-60 yrs.) in Jaipur city. For this purpose a structured and standardized questionnaire was used. Results indicate a positive association between knowledge and attitude at 5% significance level. Even a significant change was observed in knowledge, attitude and practices before and after incidence of disease. For both males and females, these changes were recorded for knowledge, ($p<0.001$); attitudes ($p<0.001$) and ($p=0.002$) and practices ($p<0.001$). The study indicates strong association between knowledge, attitude and smoking for males and attitude and weight control for females (chisquare values- 44.27,1.05 and 5.78). But significant association could not be observed for knowledge or attitude with alcoholism, weight control practices, obesity and central adiposity. Thus, more effective intervention methods, teaching regarding various aspects of artery disease is essential to prevent further expansion of the disease in the world.

OPEN 7 **Linseed: their suitability in cardiovascular diseases.** *Shalini Arora* and Ragni Modgil Department of Food Science and Nutrition College of Home Science, Himachal Pradesh Krishi Vishvavidyalaya, Palampur-176062,Himachal Pradesh

Keywords: Cholesterolemic, LDL-cholesterol, HDL-cholesterol,Triglyceride

Cardiovascular diseases are inversely correlated with high-density lipoproteins and directly correlated with low density lipoproteins. Three varieties of linseed viz. Janaki, Surabhi and Nagarkot were analysed for their protein quality and cholesterolemic effect. Results showed that at 15 and 25 percent level of Janaki, Surabhi and Nagarkot variety in diet of rats, the Feed Efficiency Ratio (FER) value were 0.179 and 0.188, 0.201 and 0.207,0.202 and 0.211 respectively and Protein Efficiency Ratio (PER) values were 1.79 and 1.88, 2.01 and 2.07,2.02 and 2.11 respectively. Significant lowering was observed in blood total cholesterol, blood LDL-cholesterol and blood triglycerides, when linseed was incorporated in diet of rats (at 15% and 25% level), as compared with non-linseed group. Inclusion of linseed increased blood HDL-cholesterol thus ultimately reduced LDL:HDL ratio, specially at 25 per cent level in diet. Weight of organs i.e. liver, kidney and spleen were significantly reduced in rats fed on linseed diet when compared with that of control group containing 1 per cent cholesterol. Among all the three varieties of linseed, Janaki variety was found to have maximum hypocholesterolemic effect. Findings of present study indicate that linseed may prove to be beneficial for cardiovascular patients, when incorporated into diet.

OPEN 8 **Sensory attributes of papad and noodles prepared from Finger Millet (Eleusine coracana)** *Vidyavati,H.G.*, Mushtari Begum,J., Vijayakumari,J., Shamshad Begum,S. and Sumangala S.Gokavi., Division of Home Science, University of Agricultural Sciences Hebbal, Bangalore 560024,Karnataka

Finger millet based papad and noodles were prepared at fifty percent substitution level with blackgramflour and riceflour, respectively. Sensory evaluation was conducted on a five point hedonic scale by a semi-trained

panel of ten judges. The sensory attributes of finger millet papad (fried) revealed that the scores for experimental papad was slightly less compared with the scores of 4,7,4.6 and 4.6 for appearance, texture, and flavour, respectively for control, however scores for finger millet papad was 4.2,4.1 and 4.4 respectively for the same attributes. The overall acceptability scores was found to be 4.7 for both control and experimental fried papad. The sensory profile of finger millet papad (roasted) indicated higher scores for control with 4.4.4.0.4.1 and 4.2 for appearance texture, flavour and overall acceptability followed by 3.1,3.7,4.0 and 3.7, respectively for finger millet based roasted papad. Similarly, the sensory evaluation of finger millet noodles indicated best results with highest scores of 4.7,4.0 4.3 and 4.5 for appearance, texture, flavour and overall acceptability as compared to the corresponding scores of 4.1, 3.8,4.1 and 3.8 respectively for the control product. The statistical results of finger millet based products revealed that there was no significant difference among all the sensory attributes for finger millet papad (fried). However, significant difference at 5 per cent level was found for appearance and overall acceptability. There was no significant difference for texture and flavour for both finger millet papad (roasted) and finger millet noodles. Hence, the diversified usage of finger millet would serve as a good blend in the preparation of papad and noodles.

OPEN 9 **Effect of spirulina on growing children.** *Aradhana Dixit* and Nandini Sarwate,Nutricia India Pvt.Ltd., New Girls PG College,Indore (M.P.).

Growing children forms the most vulnerable group of the society. This is the age where nutrients needs are increased, therefore good nutrition is needed to fulfill their increased requirements. A comparative study was done on children aged between 8-12 years. In the present study 60 samples were taken out of which 30 were experimental and 30 were control. Spirulina a nutrient dense complete food was fed to samples of experimental group, for period of one month. Growth pattern was measured through anthropometric measurements i.e. Height and Weight. Collected data of height and weight was analyzed by using t-test. Results showed that there was no significant difference seen between initial height and weight of samples of both the groups. Though there was no significant difference seen in final height of the samples of experimental and control group. Slight change in height was seen in experimental group. There was significant difference ($p<0.05$) seen in final weight of samples of experimental group.

OPEN10 **In vitro bioavailabilty of iron from wheat flour fortified with ascorbic acid, EDTA and SHMP with or without iron.** *Binata Nayak* and K.Madhavan Nair, Department of Biophysics, National Institute of Nutrition, Indian Council of Medical Research, Jamai-Osmania,Hyderabad-500007, Andhra Pradesh, India.

A laboratory scale technology was developed to fortify wheat flour with absorption promoters of iron such as ascorbic acid, ethylenediaminetetraacetic acid (EDTA) and with a stabilizer sodium hexametaphosphate (SHMP) with or without iron. The in vitro bioavailability of food (Indian bread, chapathi) prepared with the wheat flour fortified at 60 mg of iron/kg with or without the three chemical additives at 1:1 molar ratio was tested. EDTA enhanced the in vitro bioavailability of both intrinsic and extrinsic iron from Indian bread, whereas ascorbic acid influenced only the intrinsic and SHMP extrinsic iron bioavailability. The predicted bioavailability of iron in man from Indian bread containing both ascorbic acid and EDTA was two times higher than that with wheat flour or with SHMP (8%). Inclusion of ascorbic acid, EDTA or SHMP in iron fortified wheat flour enhanced the predicted bioavailability to about 1.5 times (10%) from Indian bread. It is concluded that wheat flour fortified with iron and EDTA can form a good strategy of enhancing the availability of both intrinsic and fortified external iron.

OPEN11 **Analytical study of confirmed breast cancer cases at Jawaharlal Nehru Cancer Hospital.** *Asmita Jain,* Archana Mishra, Meenakshi Saxena, *Pankaj Chaturvedi, MLB College,Bhopal, *Jawaharlal Nehru Cancer Hospital, Bhopal.

One of the most common causes of death in women is Breast Cancer. Incidence of Ca Breast is on an increase the world over. There are various factors related to this increase in the incidence of Ca Breast in India. The study was conducted on 68 confirmed cases of Ca Breast at the Jawaharlal Nehru Cancer Hospital. The parameters of the study were - Family history, exposure to Methyl Iso Cyanide, stage at detection, menstrual history, obstetric history, span of lactation, use of contraceptive and HRT, B.M.I., diet, food frequency, food diversity. On the basis of a standardized performa and pathological staging the retrospective and existent information was gathered and analytical study was done. It was observed that the age range of cancer had a broad spread. The age of menarche was observed to be tumbling down and the age of menopause was slightly delayed thus increasing the reproductive span. There was a positive correlation between Breast Cancer and delayed marriage, MIC exposure, frequent abortions, early termination of lactation, obesity and consumption of excess oils and fats.

OPEN12 **Effect of body fat mass on cardio-respiratory function in female university students (22-24 yrs.)** *Subha Roy,* M.B. Mandal* and Usha Singh, Department of Food and Nutrition, R.A.U., Pusa - 848 125, *Department of Physiology, IMS, B.H.U. - 221 005

The importance of the fat content of human body is well recognized because it may influence the morbidity and mortality, after the effectiveness of drugs and anaesthetics, affect the ability to withstand cold stress and starvation and serves as an index for health status. Higher body fat mass is known to increase the risk of cardiorespiratory diseases in elderly people. However, its effect on cardiorespiratory function in young subject is not clear. Therefore the present study was carried out in 60 unmarried volunteers (22-24 yrs.) to assess the relation of body fat mass to the cardiorespiratory status in adult unmarried female from middle class family. Out of 60 girls 36.6, 45 and 18.4% fall under low (6-11kg), medium (11-15 kg), high (15-37 kg) body fat mass group. The vital capacity and blood pressure (both systolic and diastolic) was not significantly affected by the amount of body fat mass in young girls of age group 22-24 yrs.

POSTER SESSION

COMMUNITY NUTRITION

PSCN1 **Growth performance of affluent Indian children is similar to those in developed countries**
Nita Bhandari, PhD*, Rajiv Bahl, PhD*, Sunita Taneja, MD*, Mercedes de Onis, MD** Maharaj K Bhan, MD***. * Scientist, Departmment of Peadiatrics, All India Institute of Medical Sciences, New Delhi, India. ** Medical Officer, Department of Nutrition for Health and Development, WHO, Geneva, *** Professor, Department of Pediatrics, All India Institute of Medical Sciences, New Delhi, India.

A cross sectional survey was conducted to determine whether an affluent population in South Delhi had a growth performance similar to those in developed countries. An additional aim was to identify the socioeconomic factors within this group that are constraints to optimal growth. 521 children aged 12-23 months were identified. Children's weight and length (n=395) and height of mothers (n=331) and grandmothers (n=153) and family socioeconomic status and child feeding practices were obtained. Children born premature (<37 wks gestation) and those with illness know to adversely influence growth were excluded from the analysis as was done for the NCHS/WHO reference population (n=54).

In 341 children included in the analysis, the mean Z-scores for weight for age (WAZ) were -0.45 (SD 1.2), length for age (LAZ) -0.28 (SD 1.0) and weight for length (WLZ) -0.32 (SD 1.1). About 6% of children were underweight (WAZ ≤ -2), 3% stunted (LAZ ≤ -2) and 4% wasted (WLZ ≤ -2). The factors that were significantly associated with higher length-for-age were any parents education ≥17 years (mean LAZ -0.17) and non-vegetarian diet (mean LAZ - 0.18). None of the socioeconomic factors were associated with mean weight-for-length. The children in this affluent population were close to the NCHS/WHO reference population with regard to anthropometric indicators, the subpopulation with higher parental education had even better growth. This subpopulation is being included in the WHO Multicentre Growth Reference Study (MGRS).

PSCN2 **Utilization of processed and unprocessed finger millet (Eleusine coracana) in urban and rural dietaries.**
Mushtari Begum, J., Vijaykumari, J., Sumangala S. Gokavi and Shamshad Begum. Division of Home Science, University of Agricultural Science, Hebbal, Bangalore 560 024.

Finger Millet (Eleusine coracana) is a rainfed crop termed as nutri-cereal and known for its superior nutritional qualities. It is extensively grown in southern part of Karnataka. The present study was conducted to assess the consumption pattern and processing of finger millet at household level. The study consisted of 100 rural and 100 urban families who either grow the crop of procure the same from market for household consumption. Results indicated that rural and urban households were using finger millet flour mainly in preparations of dumpling and roti. Households from rural and urban areas consuming dumplings and roti were 100 and 94 percent and 85 and 87 percent respectively. Occasionally shavieng, a steamed product was prepared by 34 percent of rural families. Dosai was prepared form finger millet by 22 and 25 percent of urban and rural households respectively. Among commercial products, about 13 prevent of urban and 7 percent or rural households were purchasing and consuming papads as an adjunct in the dietaries. Finger millet based baked and fried snacks purchased by rural and urban families were in the range of 4-7 and 1-5 percent respectively. Among the processing methods, germination 94 percent was done by urban families followed by roasting (15%). However rural households were using wet processing and roasting to an extent of 38 and 20 percent respectively. Processing was done mainly for utilization in children foods. Hence, diversification of products

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from finger millet at household level helps in widening of food basket, to meet the hunger of fat growing population, over which is narrow at present due to dependence on fewer crops.

PSCN3 **Intervention on improving health-related knowledge and practices of children attending NFE centres of Jaipur district.** *Pooja Talikoti,* and Nicheta Goel, Department of Home Science. University of Rajasthan, Jaipur.

An intervention study was carried out on improving health-related knowledge and practices of children after conducting the preliminary survey to know the existing knowledge and practices related to health and nutrition. Based on the knowledge scores, lesson plans and IEC packages on healthy food, personal hygiene and safe water were prepared using 'child-to-child approach' method. Helminthes (worms) was one of the common complaint reported by the children and also was supported by the clinical examination. Hence, deworming tablets were given to the children followed by nutrition and health education (NHE). There was a significant hike in the percent of knowledge and practices related to the three packages (52% & 48%). The NHE packages were well received by the children and child-to-child approach was found to be effective. The children were also subjected to memory span test, before and after the intervention. There was slight increase in memory scores (around 8%). Thus, the study concludes that a combination of strategy including NHE and deworming course is not only cost effective but also accelerates the cognitive functions and improves the health of the primary school going children.

PSCN4 **Food habits and dining behaviour of normal and visually handicapped school going children.** *Vandana Bharti* and Munira M. Husain, Govt. New Girls Degree College, Kila Maidan, Indore (MP).

300 school going children, 7-12 years of age, 150 each of normal and visually handicapped were selected through purposive sampling method. Their food habits and dining behaviour were assessed through questionnaire and observation method. Obtained results revealed that the number of meals taken per day were found significantly different ($P < .01$). Majority of them, 54% normal and 96% visually handicapped children were taking 3 meals/day. The speed of eating of comparative groups were also found different significantly ($P < .01$). Majority of normal children (92%) have had slow eating speed. On the other hand 39.3% and 56.7% visually handicapped children have had fast and slow eating speed respectively. The dining behaviour of the comparative group is found significantly different ($P< .01$). More normal children (66.7%) were not in habit of spilling food during eating whereas more visually handicapped children (81.3%) were found in habit of spilling food sometimes. Regarding habit of left over food in dining, it is found that 73.3% normal and 49.3% visually handicapped children were not in habit of leaving food whereas a considerable percentage (42.7%) of visually handicapped children have had in habit of leaving food in plate sometimes.

PSCN5 **Dietary pattern of tribal women in Meghalaya.** *D. Agrahar-Murugkar,* P.P. Pal, C. Awasthy and D. Synjri, ICAR Research Complex for NEH region, Umori road, Umiam - 793 103.

Studies were conducted in two villages of Ri-Bhoi district in Meghalaya, Umroi Labansaro and Umori Byrthih to evaluate the dietary habits of Tribal women of Meghalaya. A total of 25 households and 100 women and children from each village were selected randomly through lottery method. Questionnaire were developed where information regarding household schedules, 24-hour dietary recall, food frequency questionnaire and nutritional assessment of clinical deficiencies was collected. Anthropometric data were also collected for female children below 5 years.

Results revealed that most women had an annual income between Rs 30,000 to Rs. 70,000/-. Their staple food included rice, roots and tubers like potato, yam, colocasia, tapioca and sweet potato. Unconventional green leafy vegetables like Jarynglud, Jarynphong, Jarain, Jamyrdoh, Lettuce, Spinach, mint etc. were consumed on a daily basis. Fermented food like fermented soya, tungtap (fermented and dried fish) were also consumed weekly. Flesh foods were consumed on a weekly basis and frequency of consumption depended on the monetary status. Milk was very rarely consumed in all the respondents including children. Even tea was consumed as red tea. No severe nutritional deficiencies were seen in the female children studied. The food consumed generally met the recommended dietary allowances for Indians. Further examination is required to collect more details regarding food habits.

PSCN6 **Growth and nutritional status of breast fed infants.** *Seema Gaur* and Maya Choudhary. Department of Food and Nutrition, College of Home Science, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan.

In a longitudinal study growth pattern of thirty exclusively or predominately breast fed infants was studied in Udaipur city, Rajasthan. Infants selected were from healthy mothers of the age between 20-35 years, parity 1-3, normal full term delivery and birth weight >2.5 kg. Anthropometric measurements were taken at the age of 10-20 (stage -I), 75-85 (II), 135-145 (III) and 195-205 (IV) days. Results revealed that weight, length, head, chest and Mid upper arm circumference increased from 3.41 kg, 51.5, 35.2, 33.5, and 10.1 cm at stage 1 to 7.43 kg, 66.26, 42.4, 42.8 and 13.62 cm by stage IV respectively. The increase in all the body measurements was significant ($p< 0.001$). Weight, length weight/length and MUAC were 95-108, 99-103, 85-103, and 90-103 percent of standards (NCHS, Jelliffe) indicating the normal nutritional status of the infants. Chest to head ration was 0.95 at stage I which increased to 1.01 at other stages. Female infants were growing comparatively at slower rate then their male counterparts. Rate of growth in body weight at different stages revealed the fastest growth between I and II stage. The results conclude the importance of breast feeding for normal growth of infants.

PSCN7 **Milk intake and growth of breast fed infants during first six months.** *Mala Meghraj* and Maya Choudhry, Department of Foods and Nutrition, College of Home Science, Maharana Pratap University of Agriculture & Technology, Udaipur, Rajasthan.

Growth of thirty breast fed infants was studied longitudinally at 10-20 days (I), 75-85 days (II) and 135-145 days (III stage) of infant age. Healthy well nourished lactating women 20-35 years of age were selected from hospitals of Udaipur. Breast milk consumption as estimated by deuterium dilution technique, and nutrient intake as calculated from the measured concentrations of milk macro nutrients were compared with infants growth and recommended intakes of the nutrients. Breast milk intake increased from 636 g/day (I stage) to 899 g/day at III stage ($P < 0.01$). The absolute amount of nutrient intake increased as lactation advanced ($P < 0.01$). Each milk variable when related to infant body weight declined with increasing infant age ($P < 0.01$). The consumption of energy and protein per kg body weight was adequate at all ages with recommendations. Infant growth progressed satisfactorily compared with NCHS (1977). Milk intake at all stages and fat and energy intake at I and II stages was correlated with infant growth. Multiple regression models showed that energy intake was the only factor that influenced weight gain in infants from birth weight. Results indicate that infant demand for milk and nutrients in the direct where as maternal nutritional status, breast milk output and composition are the indirect determinants of infant growth.

PSCN8 **'The effect of birth interval on the nutritional status of preschool children in tribal family of Jhabua district of Madhya Pradesh'.** *Nidhi Gupta* and Preeti Taneja, Dr. Baba Saheb Ambedkar National Institute of Social Science, Mhow and M.G.M. Medical College, Indore Madhya Pradesh.

Less birth interval has an adverse effect on nutritional status, care and nutrition of both the new born as well as older sibling suffer. In order to get in-depth information about the effect of birth interval on the nutritional status of preschool children in tribal family, 430 families having at least one child of 0-6 age group of 67 villages of jhabua district were included in study. It is found that 31.6% families had 3 or more children below 6 years of age, indicating short birth interval among them. The study shows that 27.5 - 30% of all children, the birth interval is less than one year and only children shows a steady rise as the birth interval increases from one year or less (10.3%) to 3 years or more (34.5%). Another interesting finding is the gradual fall in the percentage of several malnourished children as the birth interval increased from one year to more than three years. 27.5% children were severely malnourished with a birth interval of upto one year as compared to 14.5% children in whom the birth interval was three years or more.

PSCN9 **Impact of chronic infection on antrhopometric measurements of the preschool aged children,** *Rachana Gangrade*, and Munira M. Hussain Govt. New Girls P.G. College, Kila Maidan Indore (M.P.).

500 cases of preschool children (experimental group) suffering from different chronic infections [Diarrhoea (80), Helminths (31), Nephritis (52), Respiratory Infection (246), Pneumonia (44) and Malaria (47)] were taken up by pruposive sampling method from district Hospital Ujjain (M.P.) and 200 normal (normal group) peers were taken up from respective residents of Ujjain. Detailed anthropometric measurements were taken up. Obtained results show that the mean height [95.13 (6.84) and 89.82 (14.9)], body weight [12.86 (2.02) and 12.02 (3.33)], mid upper arm circumference [15.43 (2.91) and 13.12 (1.45)], chest circumference [49.63 (2.55) and 48.03 (3.46)], and head circumference [48.80 (2.178) and 45.44 (2.171)] were found in normal and infected children respectively. All anthropometric measurements of infected children were found significantly lower ($p<.01$) than normal group with not significantly different mean age [4.10 (0.75) and 3.97 (0.8)]. The means of all anthropometric measurements of children suffering from different types of chronic infections were found significantly different ($p<.01$), mean age of the comparative groups was found significantly different so it was considered as covariate. The experimental and normal, both groups have high prevalence (35.2% and 46%) of first grade malnutrition and infected group also has high prevalence (10%) of severe malnutrition too. From these findings it is obvious that chronic infections have severely retarded the physical growth of the preschool aged host children.

PSCN 10 **Attitudes of the elderly towards developed ready-to-eat foods.** *Uma L.A.* and Meera Rao, College of Rural Home Science, University of Agricultural Sciences, Dharwad-5 (Karnataka)

An assessment of the attitudes of the elderly towards developed Ready-To-Eat foods was studied after the preliminary survey on food preferences of the elderly. Among the developed Ready-To-Eat foods, majority of the elderly wished to use Aralu mix (71%) and Semina (89%) as part of a meal. Soy or Greengram porridge mixes and uppama mix were preferred to be used as meal or snack as such. Semisolid and solid forms of Ready-To-Eat foods were preferred for consumption. Usage of Ready-To-Eat food as a supplement or substitute was opined by majority of the elderly (>50%). Monthly purchase of Ready-To-Eat food was wished by the elderly. All the test subjects (100%) were willing to purchase Aralu mix. Males had more liking towards Soy porridge mix over other Ready-To-Eat foods. Frequency of purchase was influenced by family income. Majority of the elderly suggested to modify the quantity of Ready-To-Eat food supplied.

PSCN11 **Awareness levels of the patients with regard to hyperlipidemia and its consequences.** *Aarti Sankhla*, A.K. Sankhla and Priyanka Surana, College of Home Science, MPUAT, Udaipur.

Findings of a research study undertaken to asses the awareness of the subjects through pretested questionnaire suggest that despite of their being hyperlipidemic, only one third of the study subject could choose the correct definition and majority of them were not even familiar with the term hyperlipidemia. When asked about safe levels of lipid parameters, only 34% of them were aware about latest concept of safe blood cholesterol level of less than 200 mg/dl and 43% of respondent still considered 250 mg/dl as a cut of point. Safe levels of triglycerides were known to only one fourth of patients. Like wise, a very low percentage of 14 were congizant with the term HDL-C and LDL-C as good and bad cholesterol, respectively. Still very small fraction of the hyperlipidemic subjects were aware with desirable level of these lipid parameters. In contrast, relatively better awareness was observed with regard to consequences of hyperlipidemia as only 11% of them expressed their inability to answer.

PSCN12 **Dietary status of hyperlipidemic subjects.** *Aarti Sankhla*, Priyanka Surana and P.K. Dashora, College of Home Science, MPUAT, Udaipur.

The results on intake of dietary essentials by the fifty hyperlipidemic adult males, when studied using 24 hour recall method for two consecutive days clearly show that in view of recommendations for balanced diet, a grossly deficient intake of all the foodstuffs except fruits and fats & oils was observed. The deficiency wherever existed ranged form 35.17% (cereals) to 91.28% (roots and tubers). This can be reasoned as special effort made by the subjects to possibly manage their hyperlipidemia. However, the subjects perhaps did not care to reduce their visible fat intake which they should have first attempted. The observations were reiterated when the dietary intake was examined in terms of its nutritional composition. Intake of all the dietary essentials but fat and vitamin 'C' was less than their respective RDAs. The higher intake of fat is certainly undesirable but vitamin 'C' (an antioxidants) intake seems to be a matter of genuine satisfaction.

PSCN13 **A study existing food practices of village women during diarrhoea in dimoria development block, Assam.** *Malaya M. Bora*, Dept. of Home Science Handique Girls' College, Guwahati-781 001 (Assam)

Diarrhoeal disease are very common throughout the state of Assam and has been one of the major causes of mortality of young children. Hence, a study was undertaken on the village women in the Dimoria Development Block under Kamrup district, Assam to find out the existing food practices during the ailment and to assess the knowledge regarding causes, prevention and the control measures of diarrhoea. Altogether 125 women from ten villages having children under five years affected by diarrhoea (within the last six months) were randomly selected, personally interviewed by a structured, valid and reliable schedule. The data were presented by using suitable statistical analysis. The results indicated that 45% of women had perceived knowledge about causes, signs and symptoms of diarrhoea with dehydration. However, 75% of women were unaware of Rehydration solutions while 25% of them were reluctant to follow it. Deep-fried and spicy food during diarrhoeal episodes was completely avoided by 90% of the respondents. It was interesting to find that 80% of women have used herbal medicines for treating diarrhoea. The most common medicinal plants/herbs used by them were extracts of tender leaves of Guava, Jackfruits, Manimuni (Indian pennywart), Tengechi (sorrel), Matikaduri (Alternanthere sessilis), Bhedailata (Paederia foetida) and curry leaves etc. Lemon juice, Boiled green bananas, Amora (Spondius-sp), Goats milk were also used. After attending the health education programme, it was found that 92% of the women developed skill in preparing home-made solutions and also showed a positive attitude towards using them for their children.

PSCN14 **Eating habits of young children with down's syndrome.** *M. Seena* and V. Saradha Ramdas, Department of Food Service Management and Dietetics, Avinashilingam Unversity.

Down syndrome is a mental retardation syndrome caused by chromosomal problems at conception with a prevalence rate of one in 920 live births. They have dentition problems with several missing teeth. Fifteen girls and boys each in the age group of three to sixteen years with Down syndrome were selected from mentally retarded schools. Their socioeconomic status, height, weight, medical history, dietary pattern and feeding problems were collected using a questionnaire. All the children were shorter by 12 to 25 cm. Nineteen of the subjects were non-vegetarians. All disliked vegetables and milk. Bakery and fried items, ice creams and chocolates were their favourite. Fifty per cent of the children had problems in consuming food due to abnormal teething and improper hand to mouth coordination. Children either swallowed whole foods or spit foods mostly due to protruding tongue or throat related problems. The caloric intake in the age group of four to nine years had a percentage deficit and hence had a little lower or neat normal weights whereas during adolescence they had surplus intake and so became obese. Except fat, intake of protein, vitamins A,C,B_1 and B_2 and iron and calcium showed a percentage deficit. Counselling was given to the parents to improve their dietary pattern and eating habits.

PSCN15 **Nutritional status of rural school children.** *Jain S.,* Bhathanagar, V., Chelawat,S.and Mathur,P. All India Co-ordinated Research Project. Department of Foods and Nutrition. College of Home Science. MPUA&T Udaipur-313001,India.

Nutritional status of 400 rural school children aged 6-12, years residing in rural areas of Udaipur (Rajasthan, India) was assessed by anthropometric measurements and clinical examination. Children studying in Government school of three villages namely Badganv Chikalwas and Madar were taken for the study. These villages are situated at the distance of 15 to 30 km from Udaipur city. Gomez classification showed that only 24 percent children were normal irrespective of their age and sex. However severe form of malnutrition was more prevalent among children of 9 to 12 years than of 6 to 9 years. Mean weight of children was 19.76 kg. representing 73.13 percent of NCHS standards irrespective of age and sex. The children of 9 to 12 years were significantly heavier than of 6-9 years. But the weight/age percentage to NCHS standards were significantly lower among 9 to 12 years children indicating a deficit in growth rate at this age. Mean height of the children was 123.46 cm irrespective of age and sex. It was 95.45 percent of NCHS standards. Weight for height ranged between 80.35 percent for males of 9 to 12 years to 83.05 percent for females of 6 to 9 years indicating the prevalence of mild malnutrition among children. Clinical examination indicated that about 42.5 percent of children had either of one sign of nutritional deficiency. Signs of iron deficiency i.e. pale conjunctiva and koilonchea was observed in 23.251 and 21.25 children respectively. Bitot'spot and conjunctival xerosis were observed in 6.25 and one percent of children. This study concludes that in spite of number of nutritional programme launched by govt. mainutrition is still prevalent in rural school children.

PSCN16 **Development of iron rich powder from rice bran and its acceptibility in food preparation.** *Jain,Shashi* and Mathur, Shubhra.Deptt. of Foods & Nutrition, College of Home Sciene,MPUA&T, Udaipur-313001, India.

Rice bran is a by product obtained during milling of paddy to get edible rice. It contains about 35 percent iron and can be used as a source of iron in daily diet. However presence of high fiber contents restricts its uses for the purpose hence present investigation was conducted. Rice bran was soaked for 48 hrs and boiled for one hour. The strained liquid was then concentrated to thick liquid and further dried to powder. Estimation of total and invitro-bioavailable iron using atomic absorption unit reveals that the developed powder contains

266mg/100g of iron and has 95 percent bioavailability. Five preparations which are commonly consumed in daily diet were standardised for one serving and used to assess the acceptability of developed powder. One gram of powder per serving was added in each of the preparation namely chapati (Indian bread), green gram dal, potato-spinach vegetable, ridgegourd vegetable and rab (a maize flour-butter milk preparation. This powder was added at the time of serving in all the preparations except chapati. In chapati it was added in the flour. Sensory evaluation was conducted by a panel of judges using 9 point hedonic scale. Mean scores for various preparations were- chapati- 6.82, green gram dal 7.35, potato-spinach vegetable-7.3, ridge gourd vegetable-6.78 and rab-6.9 indicating the moderate acceptability of the developed powder. Thus it is concluded that the iron rich powder developed from rice bran can be used in preparations to increase the iron density of daily diet.

PSCN17 **Nutritional status of farm labourers.** *Monica Dungarwal* & Maya Choudhry, Department of food and Nutrition, College of Home Science, Maharana Pratap University of Agriculture and Technology, Udaipur.

A cross sectional study on 50 males farm labourers (aged 20-39 Yrs.) of Agriculture research substation, Sumerpur, Rajasthan Agricultural University was conducted to assess the nutritional status. A dietary survey by 24 hours recall method was conducted for three consecutive days. Body measurements were taken by using standardised techniques. Results revealed that farm labourers were consuming cereals only as per the balanced diet. Intake of protein, calcium, iron, thiamine and niacin was more (100 to 185%) and those of riboflavin (81%) and energy (73%) less than RDA. The most limiting nutrient in their diet were vitamin C and fat. Anthropometric measurements-body weight (kg), height (cm), BMI (kg/m^2) and weight/height (%) were 47.6,162,17.6 and 75.6 respectively depicting low weight for height. BMI indicated that only 12% labourers were normal and rest 88% were suffering from different grades of chronic energy deficiency. Energy intake per kg of body weight was low i.e. 44 Kcal/kg in comparison to 48 Kcal/kg for a moderate worker. Energy expenditure was 2463 Kcal/day having a negative energy balance of 378 Kcal/day. Findings reveal that if their intake of food is increased and energy expenditure is reduced using improved farm implements then they will be able to achieve energy balance & consequently their Nutritional Status.

PSCN18 **Impact of nutrition education In the management of iron deficiency anaemia**. *Sumana. A* and Jhansi Rani.P., Department of Home Science, Sri Sathya Sai Institute of Higher Learning, Anantapur Campus, Andhra Pradesh.

The present study was conducted to assess the impact of nutrition education on anaemic adolescent girls from college and slum areas of Anantapur town. A preliminary survey conducted before imparting nutrition education indicated poor nutritional and iron status of adolescent girls residing in Anantapur. Subjects were randomly screened for percent haemoglobin by cyanmethhaemoglobin method. Subjects were selected based on the haemoglobin cut off point as 11gm/dl (WHO,1998). Examination of pretest scores of the selected subjects revealed less knowledge, improper and poor dietary attitudes and practices regarding iron nutriture. Suitable material was developed by the investigator. Nutrition education was imparted with the help of the above and readily available material. A holistic, multidisciplinary focus developed by nutrition education resulted in significant increase ($p<0.01$) in the subject's knowledge, attitudes and practices.

PSCN19 **Comparison of Infant Feeding Practices Among Rural And Urban Migrant Children.** *Kanika Varma* and Beena Mathur, Deptt. of Home Science, University of Rajasthan, JAIPUR

The present study was undertaken to study the prevalent infant feeding practices of children aged 6-36 months from rural and urban migrant families. The study was conducted in Chaksu district and urban slums of

Jaipur district. Both groups were residing mainly in kutcha houses with few basic amenities available. Most rural fathers were agricultural workers and illiterate. All urban fathers were construction workers and nearly half of them were illiterate. The rural children had better dietary and nutrient consumption than the urban children. Dietary assessment revealed that cereal, pulse, vegetable and fat intakes were grossly inadequate. The intakes of iron, vitamin A,C, and B complex were below the RDAs. The clinical signs of energy protein malnutrition, anaemia and vitamin A deficiency was observed. The prevalence of malnutrition was also higher in the urban group and 13-24 month old children. It was found that children belonging to rural groups, educated mothers and economically better off families and who were weaned at the right time with appropriate kind of foods had better weight for age.

PSCN20 **Nutritional status and supplementation of coconut palm jaggery and calcium tablet in rural post menopausal women.** Sujata R and Kavitha.K., Vellalar college for women, Affiliated to Bharathiar University, Erode, Tamil Nadu.

This study was undertaken with the objective of assessing the nutritional status and the beneficial effect of supplementation of coconut palm jaggery and calcium tablet on rural postmenopausal women. The calcium present was 2950 mg per 100g of coconut palm jaggery and cod liver oil rich in vitamin C. Total of 100 subjects belonging to middle and low class family were selected randomly. From these 30 subjects having serum calcium levels below 9mg/dl were selected and divided into 3 groups consisting of 10 member in each for the supplementation study. Group I was given with calcium tablet 500 mg. per day, group II coconut palm jaggery 30 g per day with 300 mg of cod liver oil and control group does not receive any supplements. The supplementation was done for a period of 90 days.

Before supplementation all the subjects showed symptoms of calcium deficiency and after supplementation they recovered from the symptoms. The initial serum calcium level of the group I was found to be 7.8 ± 10.36 mg/dl, group II 8.3 ± 0.39 mg/dl, control group 7.6 ± 0.294 mg/dl. After supplementation, the serum calcium level was increased to group I 10.0 ± 0.53 mg/dl and group II 9.7 ± 0.35 mg/dl. Comparison between the control with group I show 't' value (13.7), control with group II also show 't' value (14.7) and significant at 1% level. The inter comparison between the group I & II was not significant at 1% level. The inter comparison between the group I & II was not significant. Coconut palm jaggery with cod live oil are found to be the best dietary for calcium source without any side effects compared with the tablets and also cost is very low (Rs. 1.05/day) when compared with calcium tablet (Rs.2.60/day). The results of the present study will create an awareness about the nutritional value and cost wise utility of coconut palm jaggery without any side effects among the rural and urban community.

PSCN21 **Nutritional profile of preschool children of chandrapur city of Maharashtra.** *Asha Mane* and Vidhya Kolhatkar, Post Graduate Teaching Department of Home Science, Amravati University, Amravati [MS].

Chandrapur district of Maharashtra scheduled under backward district, so there is need to plant developmental programme. Health and nutrition is very important aspect of development. For nutrition programme nutritional profile is the prerequisite. Therefore attempts were made to prepare nutritional profile of preschool children residing in slum area of six zones of chandrapur city. Study was conducted on a random sample of 150 preschool children. General information was collected by oral questionnaire method. One day diet survey was carried out. Height, weight, arm, head and chest measurements were taken. Clinical examination was done to ascertain deficiency disorder. About half of the children belonged to backward class category and half of the mothers were illiterate. Their family income ranges between Rs. 800-3000/month. Ninety three percent

children were immunised. Ninety four precent children consumed mixed diet. Their diets were deficit in cereal, pulses, sugar and jaggery, oils and fats and grossly deficit in green leafy vegetables, and milk. They obtained only 50% of energy, protein, calcium, thiamine and niacin, 30% riboflavin and carotene and 25% vitamin C from their diet. 58% and 34% children belonged to grade 2 and grade 1 malnutrition. Thin hair, discoloration was found in 30-40% children. Moonface in 4% children, koilonychia in 9% and bowleg in 6% children.

PSCN22 **Consumption pattern of processed food in Akola city**. *Kumudini R. Dhore* and Mayura S. Saoji, Smt. Radhadevi Goenka College for Women, Akola (M.S.) 444 005

In today's fast life consumption of processed food is inevitable, therefore, an exploratory study was conducted to know the consumption, pattern of processed food in Akola city (M.S.) A purposive sample of 150 consumers were selected and interviewed for various attributes by using structural interview schedule. The findings of the study showed that 53.34% of the respondents using processed food were between 31 to 44 years age group. Amongst the subjects 41.34% were graduates and 28% were post graduate and 46.67% were in working category.

This majority 66.67% subjects were belonging to nuclear type of family, 57.34% were comprising upto 4 membered family and 44% were with two earning members in the family. The 53.33% respondents were having monthly income of above Rs. 8500/- and used to spend about Rs. 2001 to 5000 per month on food out of which Rs. 301 to Rs. 600 per month was on processed food which is nearly 10% of the expenditure made on food items. The 92% of consumers were using bread, 94% biscuit, 68% papad, 73.73% chocolate, 78.66% ice cream, 49.33% souse, 44% paneer, 44.33% butter, 42.66 noodles, 39.33% cake, 38% suqash, 36% jam and 34.66% pickles.

The reasons put fourth for increase consumption of processed food was easy availability, time saving and modern life style food temptation. The factors influencing decision of purchase of the product were 84.67% faith of government certificate, 83.33% faith on brand name, 70% awareness of Food Science and Technology. The 89.33% respondents considered taste of product, 86.66% of manufacturing date, 74% nutritional inputs, 69% ingredients and additives included while purchasing processed food. The respondents were knowing the side effects of excessive consumption of processed food on heaith, 78.66% dental problems, 70% throat infection, 68.66% of decrease appetite, 67.33% digestion problems and 67.33% of obesity.

Although the consumers know that the home made products are more cheaper and better than processed food yet the 75.33% consumers were using processed food for the reasons lack of time and 64.67% found it energy saving. Since the processed food are convenient, ready to eat. This increased the dependability of housewife on food out side the home. The processed foods are well adapted and accepted in every home today alongwith its negative effects.

PSCN23 **Palatibility of traditional food preparations supplemented with tarota seed flour.** *Sandhya Joshi* (M.V. Deshmukh Mahavidyalaya, Amravati) and Archna Wankhade (Post Graduate Teaching Department of Home Science, Amravati)

Appearance, flavour, texture and overall acceptability are important determinants of palatability. Researches reveal that TSF is being used into buttermilk or lime water as a medicine and as a substitute for tea or coffee but not in large quantity as food. Therefore, the present research investigation was carried out to test the acceptability of TSF in common cereal food preparations, rava, halwa, rajgira halwa and singara halva. Initially, TSF was prepared after destroying toxins and antinutrients by standard techniques. Panel of judges of both sexes comprising 6 judges were selected using standard procedures. Initially, all the recipies were

standardized in relation to time, cost equipment and portion size. The substitution was done at 5 percent. 10 percent and 15 percent levels. Standard halwas were prepared for comparison which served as control. A multiparameter hedonic scale was standardized and administered to panel for evaluation. Data on each palatability traits were collected on the score card and the statistical analysis was done using two way analysis of variance. The significance was tested at $P<0.05$. The studies revealed that the differences were statistically insignificant upto the level of 15 percent substitution in APPEARANCE AND TEXTURE. However, the FLAVOUR was not totally acceptable and hence only 10 percent substitution is palatable. Furthermore, the date on OVERALL ACCEPTABILITY reveal that TSF could be substituted in halwas upto 10 percent level because at 15 percent level of substitution the palatability gets affected but not to an unsatisfactory level. Hence, the supplementation of TSF in traditional food preparations to overcome the nutrient gap and to improve the quality of proteins in cereal food preparations is suggested.

PSCN24 **Some selected nutrient content of tarota seed flour (TSF).** *Sandhya Joshi* (M.V. Deshmukh Mahavidyalaya, Amravati) and Archna Wankhade (Post Graduate Teaching Department of Home Science, Amravati)

NNMB reports reveal that the major nutritional deficiency diseases identified in India are PEM, iron deficiency anaemia and calcium deficiency disorders. The caput availability of pulses has steadily declined over the years and their prices have escalated. The solution could be the use of non-conventional and cheaper sources of pulses. Researches available reveal that the tarota (cassia Tora) seed have medicinal values and are being used in the treatment of cough, ulcers, pains in joints and ringworm itches. However, the information, regarding the nutrient composition is lacking and, therefore, the chemical analysis for proteins, calcium and iron was done using AOAC techniques. The seeds were collected randomly from Amravati City and mixed thoroughly. The toxins and antinutrients were removed using standard procedures suggested for Soyabean. The flour thus prepared was tested for selected nutrient content. The results showed that the flour contained crude protein (25.59), calcium (120.2mg) and iron (20.1mg) per 100 g. These values were compared with traditional pulse flours with the use of nutritive value tables. The comparison indicated that TSF could be the potential source to supplement the diet deficient in protein, calcium and iron. It is, therefore, concluded that the TSF protein could be obtained in lower cost as compared to any other animal or plant proteins to meet these selected nutrient gap in the diets of vulnerable sections of the community.

PSCN25 **Food consumption pattern and dietary habits of 'Kamars' - a primitive tribe of Chhattisgarh.** *Nisha Sharma,* Aruna Palta amd Maya Verma, Govt. D.B. Girl's Autonomous P.G. College, Raipur Chhattisgarh.

The 'Kamars' - a primitive tribe of nearly 13,500 population size is a circumscribed tribe living in the fastnesses of hills and forests of southeastern part of Raipur district. The present study has been made with an objective to study the food consumption pattern and dietary habits of the Kamars.

The food consumption was recorded on a pretested schedule of ICMR. Food intake for 3 consecutive days was recorded by oral questionnaire using standard measures. The study revealed that the diet was inadequate in terms of milk, animal foods, sugar, fats and oils, fruits and vegetable. Special requirement of vulnerable group is not taken care of Consumption of home made 'Mahua' liquor and tobacco by almost all the adults and even some of the children above the age of 7 was a common practice. The study suggests the need for nutrition education among the 'Kamars' in order to improve their food intake.

PSCN26 **A study of nutrient intake of hill korwas - a primitive tribe of Chhattishgarh.** *Aruna Palta* and Megha Agniwanshi, Department of Food & Nutrition, Govt. D.B. Girls' P.G. College, Raipur, Chhattisgarh.

Hill Korwa is a Kolarian tribe living in Ambikapur and Raigarh districts of Chhattisgarh. The impact of civilization has thrown this tribe in a state of trauma due to disturbances caused in their natural habitat. In this paper an attempt has been made to collect all relevant information on the nutrient intake of hill Korwas. The study was conducted on 1249 adult Hill Korwas of Sarguja and Raigarh districts. Their dietaries were found to be moderately deficient in Calories, Proteins, Carbohydrate and Niacin whereas a gross deficiency of Calcium, Vitamin A, Riboflavin and Fat was observed. This inadequacy of nutrients was because of low intake of pulses, milk and milk products, green leafy vegetables, fruits, fats & oils and sugar & jaggery etc. The study suggests the need to bring about changes in their food intake in order to improve their status of nutrition.

PSCN27 **Time trends in diet and nutritional status of the elderly.** *Ariappa, N.,* Balakrishna, N., Brahmam, G.N.V. and Vijayaraghavan, K., National Institute of Nutrition, Hyderabad.

The proportion of the elderly (60 years and above) has been increasing in the World, due perhaps to the dramatic improvement in the average life span, as a result of advancement in medical sciences, better health care and nutrition and improved living conditions. According to one of the estimates of WHO, the current elderly population in the world is about 580 million, which may increase to about 1.11 billion by the year 2025. In India, the current elderly population is 70 million (2001 census) constituting about 7% of total population. According to the projection by the Registrar General of India, the population of elderly is expected to increase to 114 million by the year 2016. In India, information on diet and nutritional status of the elderly is scanty, more so on time trends over a period of time. In this communication, changes over a period of time in the diet and nutritional status of elderly population living in rural areas are discussed. Data collected by the National Nutrition Monitoring Bureau (NNMB) in 8 States, on diet and nutritional status of the rural communities in India in two cross sectional surveys in same villages during 1975-79 and 1996-97 has been utilized. A total of 922 elderly individuals in 1996-97 and 858 in 1975-79 were covered for 24 hour recall diet survey. Anthropometric measurements were obtained on 3,646 and 3,659 elderly during 1996-97 and 1975-79 respectively.

The analysis of data revealed that the consumption of majority of foods barring cereals, roots and tubers and other vegetables was below recommended the dietary intakes (RDI) for sedentary adults. There was increase in the mean consumption of all the food stuffs, except with respect to pulses and roots & tubers in 1996-97.

Similarly, the mean intake of majority of nutrients, except iron, thiamin and niacin showed an increase over a period of time, in both the sexes. In about 65% of the elderly during 1996-97 and in 53% of elderly during 1975-79, the consumption of energy was more than RDA.

The mean and median heights and weights tended to decrease marginally with the advancement of age in both the sex. The prevalence of chronic energy deficiency (CED, BMI <18.5) decreased from 62.3% to 53.5% in males ($P<0.001$) and from 63.8% to 49.4% in females ($p<0.0001$) over the period of time. However, there was a two fold increase in the extent of obesity/over weight during this period, in both the sexes.

These results indicate that, through elderly population, have inadequate dietary intakes as compared to RDA, they show an improvement in their nutritional status. Comprehensive studies including the assessment of the prevalence of diet related chronic diseases are required so as to plan strategy of health care for the elderly.

PSCN28 **Diet and nutrition situation in drought affected areas of Andhra Prdesh, Gujarat and Rajasthan.** *Vijayaraghvan, K.*, Hanumantha Rao, D., Sarma, K.V.R., Brahmam, G.N.V., Venkaiah.K., Laxmaiah, A., Hari Kumar, R., Ariapa, N., Gal Reddy, Ch., Mallikarjuna Rao,K., Sharad Kumar, Ravindranath, M. and Damayanti. K.

Drought affects adversely country's economy by decrease in agricultural production, purchasing power, food security and simultaneously increase the rural unemployment, migration to cities, cattle deaths and ultimately affecting the health and nutritional status of the community. India experienced drought in Andhra Pradesh, Gujarat and Rajasthan during 1999-2000.

A rapid survey was conducted in these States to assess the diet and nutritional status, food security status and coping strategies adopted by the households during drought and the extent of participation of community in drought relief works in operation in the severely affected areas. About 600 households were covered for socioeconomic profile and a half of them were covered for 24 hour recall diet survey. A total of 13,725 individuals were covered for nutritional assessment and clinical survey.

The severity of drought was more in Rajasthan, in terms of extent of crop failure, cattle deaths and non availability of fodder, followed by Gujarat and Andhra Pradesh. Different coping strategies adopted by HHs during drought situation were borrowing of cash/food, consumption of low cost foods, utilization of food stocks and reducing food intake in all the three states. Drought relief programmes like food for work were more common in Gujarat (37.5%); distribution of special ration was higher in Rajasthan (62.6%) and 34.2% in Andhra Pradesh. Employment assurance drought relief works were more in Rajasthan (22.6%). Perception of HHs by current insufficiency of different food groups was maximum in Gujarat (55.0 to 62%). The average intake of food stuff were lower in drought situation compared to non drought, except cereals and millets. The average consumption of nutrients in all the three States as compared to non drought. The deficit of energy and protein in drought as compared to non-drought was higher in Andhra Pradesh (73.3% vs. 49.1%) than other two States. Prevalence (%) of wasting (<Median -2SD of weight for height) among 1-5 years children was higher in drought condition in Rajasthan (26.2) and Andhra Pradesh (31.8) as compared to non-drought indicating the impact of drought on current nutritional status of communities.

Scarcity of fodder and drinking water were observed in all the States. The production of HHs consuming <1000 kcals/CU/day was more in Andhra Pradesh (9.6%) followed by Rajasthan (1.5%) and Gujarat (1.3%). Drought relief programmes (food for work, additional food grains at subsidized rates, supply of fodder and drinking water etc.) might have contributed to the reduction in severity of impact of drought.

PSCN29 **Combating protein calorie malnutrition in rural areas - Awareness - training and enterpreneursip approach,** *R.T. Patil,* L.K.Sinha, Neerja Laian and P.K. Baig, NATP Jai Vigyan Project on Enhancing Household Food and Nutritional Security Soybean Processing and Utilization Centre. Central Institute of Agricultural Engineering, Bhopal - 462 038

Malnutrition is number one enemy of India. Due to large population and indifferent attitude towards food, has made the situation worse. Though India has becomes self sufficient in production of food grain, the change in eating habits have also brought in the effect of malnutrition as the nutritional traditional food are not seen in the diet anymore. Hence, about 40% population in our country lives below poverty line, 55% children are malnourished and 70% women are anaemic which lead to lower birth weight and weak child. Food plays an important role in overall efficiency of the population and India posses to the tune of about 50,000 corers per year due to inefficiency caused by malnutrition.

Hence under the activities of Jai Vigyan project on Household food and nutrition, our emphasis is on utilization of traditional nutri foods, supplementation with soyafoods and empowering the population by way of rural entrepreneurship for processing these crops. The approach of Awareness - Training and Entrepreneurship development was followed. Sixteen villages from Phanda and Berasia block under Bhopal District were adopted for implementation of this programme. The soymilk programme has been initiated in 3 villages and soyaflour programme is going on in all villages. The impact of such programme was assessed by interviewing 10 farm families at random and it was found that the nutrition programme has been very effective and increased the use of soybean in their daily diet significantly. This indicates that if concentrated efforts are made to popularize soybean in the form of these two products, it may solve the problem of protein deficiency and will also avoid dependence on the export market.

PSCN30 **Comparative evaluation of nutritional profile of various wheat-soy and wheat other legume blends for its dietary use,** *Neerja Lalan**, Madhu Mishra**, Vivek Mishra***, Madhu Shrivastava****
*Senior Technical Officer, C.I.A.E., Nabi Bagh, Bhopal-38. ** Ex. Dean and Professor, Faculty of Home Science, MLB College, Bhopal. *** Asstt. Prof. Saifia College of Science and Education, ****Geetanjali College, Bhopal

Supply of adequate nutrition is necessary throughout the childhood for proper growth and development of children. Cereal based Indian diet do not provide enough nutrients to satisfy their nutritional needs. Due to this children suffer from various nutritional deficiencies. Protein-calorie malnutrition is one of them. The paper deals with studies on comparison of nutrient profiles of various blends of wheat and five legume flours including soybean for selection of suitable protein calorie fortified for formulation of diets of children. Increasing the levels of substitution of wheat flour with that of soybean and other legumes raised the value of protein, fat and mineral contents of the blends. At all substitution level cost of soyfortified flour was minimum. However, at a particular price the wheat soy blends gave higher nutrient profile as compared to those of other blends. Among all the blends wheat soybean blends had maximum protein digestibility, connected amino-acid score which indicated maximum improvement in quality of wheat protein through soybean incorporation. Soybean incorporation brought maximum reduction in the quality calculated intake of fortified flour to meet the protein and energy need. The critical level of substitution was 10% for full fat soyflour followed by 17, 22, 24 and 29% for flour of bengal gram, green gram, red gram and black gram respectively.

PSCN31 **Nutritional assessment among the elderly paudi bhuyan primitive tribe of Orissa.** *Bulliyya G.,* Jangid PK, Mohapatra SSS, Kerketta AS and Das RK. Regional Medical Research Centre, ICMR, Bhubaneswar.

Orissa is one of the major states having high concentration of tribal population. The present investigation was carried out to evaluate the nutritional status among the elderly population of Paudi Bhuyan, primitive tribe inhabited in the four districts of eastern ghats. Due to small population size, all the elderly people aged over 60 years were studied from the respective microproject areas. A total of 604 free-living elderly subjects (225 males and 379 females) were evaluated for demography, socioeconomy and diet survey and anthropometry. Shifting cultivation was the main occupation and collection of minor forest produce was the chief income source. The mean values of age, body weight, height, arm span, mid-arm circumference, biceps, triceps and subscapular and suprailiac skinfolds were 68 years, 38.2kg, 14.3 cm, 156.2 cm, 20.1cm, 3.3 mm,5.6 mm, 8.1mm and 5.5 mm respectively. Classification according to body-mass index (BMI), body-mass for arm span (BMA) and waist-hip ratio revealed 17.6kg/m^2, 16.0kg/m^2 and 0.86. According to BMI (<18.5kg/m^2), 71.7% of elderly subjects had chronic-energy deficiency (CED), while 28.3% normals. The prevalence of grade-I CED was higher (33.5%) then grade-II (19.0%) and grade-III CED (19.2%). Females suffered more (73.6%) from CED than males (68.4%). The prevalence of CED (<18.5kg/m^2) was increased with the advancement in age

from 60 to 80 years. The food intake indicated a lower intake of cereals, pulses, oils, milk and vegetables and far below the prescribed levels of ICMR consumption standards. Nutrient analysis indicated lower intakes of almost all the nutrients such as energy, protein, fat, calcium, riboflavin, iron etc when compared with RDA. The food consumption was lowest during lean season of food scarcity. Mango kernel and wild varieties of mushrooms were consuming during the monsoon period. The results of this study highlighted the majority of the elderly paudi Bhuyan primitive tribal were deficient in terms of quantity and quality of food and majority suffer from CED. There is a need to strengthen the existing public health care services and supplementary feeding programmes in the tribal areas.

PSCN32 **Prevalence of nutritional anaemia in slum women.** *Anju Singh Baghel* Nutritionist Justice Tankha Memorial Spastic and Handicapped Institute, Jabalpur.

To understand the Health and nutritional problem of slum women, a study was conducted to asses the nutritional anaemia of these women. A sample of 185 women age group of 15-45 was selected randomly from Takker gram slum area of Jabalpur. These women are engaged in Bidi making. This Sample was compared with the control group of ICDS sector from the same locality. Medical examination and haemoglobin estimation by Sahli's method were used to judge the nutritional anaemia of the selected sample. Out of 185 women 72.9% had haemoglobin level below 9% gm. The study revealed that all subjects under study exhibited lower Heamoglobin range than of standards. The results did not indicate the significant difference of study sample and control group. Slum women were found to consume a monotonous meal and subsisted mainly on cereals. Poverty, illiteracy and the poor food consumption speaks for nutritional anaemia. The pattern of this area is alarming and number of deficiency diseases are seen. It is therefore necessary to understand their problem and to solve them. Nutrition education and restructuring the food patterns is the only way to do it.

PSCN33 **Age related changes in body composition and work capacity in 18-70 yr. women.** *Siddhu Anupa*, Sirohy Raksha and Sundararaj Pushpa. Dept. of food & Nutrition, Lady Irwin College,New Delhi.

The study was conducted to assess age related changes in body composition in students or working women aged 18-70 yrs(n=131). Physical work capacity at heart rate 170 (PWC 170) of subsample of women (18-60 yrs; n=25) was also evaluted. The weight of subjects increased significantly from 50.9+6.7kg 18-20 years (A1) to 67.6+4.8kg 60-70 years; (A6). Height showed a slight nonsignificant decline with age. Body mass index (BMI) registered 25.6% increase from 18-70 years and was highest for A6 group (28.3+2.9kg.m-2) indicating significant ($p<0.01$) rise in BMI with age. The body fat% also increased significantly ($p<0.05$)from 29.2+5.8% (A1)to 42.1+7.8% (A6). The fat free mass (FFM) did not differ significantly among all the age-groups. Total body water % showed significant decline with age from 52.2+4.1% (A1) to 42.4+5.7% (A6) PWC 170 of subsample was positively and significantly correlated with FFM (kg) ($r=+0.56$; $p<0.01$) and TBW (kg)$r= + 0.58$ ($p<0.01$). In the present design of the study where normal weights were selected from 18-60 yrs, PWC 170 showed no significant correlation with body fat %. It was observed that 80% of subjects in 40-50 yrs group exercised and had the highest mean PWC 170. Thus, the present study reveals that body composition generally changed with age in women and the PWC170 was influenced by components of body composition and physical activity but age related changes in PWC 170 could not be demonstrated in normal weight women.

PSCN34 **Household food and nutritional security for rainfed backward region of India.** R.S.Singh

In spite of the various plan development programmes initiated from time to time under successive five year plan, the expected goal of social justice with equitable distribution of gains has not been achieved in

India. This study under the Jai Vigyan National Science and Technology Mission Mode project on 'Household Food and Nutritional Security for Tribal, Backward and Hilly Areas' is an attempt to quantify the productive resources owned by various categories of rural poor households, utilization pattern of these resources, income and consumption pattern of the sample households and analysis of income and employment of the households belongings to various size group of holdings. The main focus was to address the issues of food and nutritional security status of the households population in the selected villages of Sidhi (Madhya Pradesh), Aurangabad (Maharashtra), Hazaribagh (Bihar) and Balasore (Orissa) districts. Information/data collected from the 4 districts, 20 selected villages and 350 households. The study revealed that all the district selected for the study are backward and tribal dominated in terms of literacy levels, agricultural and allied activities development, opportunities for non farm employment, infrastructural facilities and development programmes. All the districts have sizeable common property, land and forest resources. These resources contribute significantly in the live support system of the backwards.

This was also revealed that small quantity of marketable surplus has been generated even with the existing technology on the sample farms. Non farm employment and income opportunities are negligible. Among essential foods, only the consumption levels of cereals was at par with recommended level. Moreover consumption of pulses, edible oil, milk and milk products, non-veg., vegetable and fruits were much below the recommended level. These findings clearly shows that the standard of living of selected household was very low. To meet total food requirement of the family members, household had to purchase from the market early 17% of cereals, 36% pulses, 60% oilseeds and 38% vegetables.

PSCN35 **A study of awareness level among mothers of different sociocultural groups with reference to food patterns and health and nutritional status of preschool children in Gwalior city.**
Dr. Veena Shrivastava* & Charu Katare**, * Prof.& Head Deptt. of Home Science, ** Asstt. Prof. Home Science. K.R.G., P.G. Autonomous Girl College, Gwalior (M.P.)

Health and development status of a nation is reflected by health of its child population. These vital and vulnerable years of childhood are protected and well cared by mothers since mothers are the sculptress in chief in the first few formative years. The present study is aimed at conducting a survey to assess awareness level of mothers related to food pattern, health and nutritional status of their preschool children. 100 mothers belonging to low and middle income group were randomly selected who had children between age of 0-2 years. A questionnaire cum interview method was used for data collection. Questionnaire included general information, knowledge about nutrition, hygiene and cultural practices adopted by the mothers for feeding their children and also information regarding nutritional status and nutritional deficiency diseases among study group. Data collected for the study in being processed for analytical inferences, however primafacie, following predictions are being reported. There is no correlation between socio cultural status and health status of the preschool children. There is a positive relationship between level of education and nutritional awareness in mothers. Most of the mothers in the study group fed their children adequately i.e. as per RDA. Few of the children in the study group belonging to low income group showed nutritional deficiencies.

PSCN36 **Nutritional profile of farm women of Madhya Pradesh and impact of nutrition education.**
Deshpande, S.S.,* Mishra A.** and Mishra, M.***, * Sr. Scientist (Home Science Ext), CIAE, Nabi Bagh, Berasia Road, Bhopal ** Assistant Professor & *** Retd. Dean(Home Science), M.L.B. College, Bhopal.

Nutritional education has been defined as educational measures for inducing desirable behavioural changes for the ultimate improvement in the nutritional status of individuals and family. Nutrition education has been widely used in almost all parts of the world, as a measure against both malnutrition and under

nutrition. This is an activity commonly seen in many sectional programmes - health, social welfare, agricultural extension, general education and rural development.

The present study was carried out to impart nutrition education to the rural women in order to improve their nutritional status and to know the effect of various education/training programmes conducted. A training was conducted in four selected villages of Bhopal district of M.P. Nutrition education was imparted in three phases. Phase I included an assessment and evaluation of the present food consumption pattern. Phase II was direct nutritional intervention based on nutrition education and revolved round the incorporation of soybean in the diet of villagers on the basis of the four standardized recipes. Phase III was a follow-up to assess the actual utilization of the knowledge in practice. The training programme was given to 160 women for the popularization of soyfood. Duration of the training was three days. During the training course, women were taught about nutrition, its importance in daily meal, importance of soyfood, causes of deficiency diseases and amount of available protein and fat from soyfood to combat protein - calorie malnutrition and role of protein in weaning foods. Skills were also imparted for processing of soybean at domestic level. Preparation methods of different soyfoods were demonstrated by means of audio-visual-aids, with the help of leaflets, charts and learning-by-doing method.

The results indicated that nutrition education programme brings about a marked improvement in the dietary pattern. The frequency of use of green leafy vegetables and other seasonal fruits improved greatly. About 97% of women were not using soybean and hardly 3% were using it once in a week only whereas after the nutrition education 13% were found to be using soybean in daily preparations followed by 36% using thrice in a week and 38% once in a week. In regards, to the weaning foods for the infants, consumption was increased to great extent, more specifically 16% of the subjects started providing weaning food daily, 17% thrice in a week and 33% once in a week. Further, study observed increase in nutritional knowledge indicating 2:3 times increase of nutritional awareness exhibiting substantial impact of the nutrition education programme and its impact.

PSCN38 **Chilhood obesity: development and assessment of an information, education and communication (IEC) pacakage for parents.** *Puja Kapur* and Mohini Sethi, Department of Foods and Nutrition, Institute of Home Economics (University of Delhi) F-4, Hauz Khas Enclave, New Delhi - 110016

The present study was conducted to assess the efficacy of an educational programme designed for parental guidance on childhood obesity. Children (n=664) aged 7-12 years were screened and 7.8% (n=52) were found obese on the basis of age and sex specific 95th BMI percentile being exceeded. The experimental and control group comprised an equal number of obese and normal weight children (matched for age and sex) respectively together with their parents. Parents were imparted nutrition education through a lecture session using IEC materials specially developed - a guide booklet titled 'Be Fit, Not fat', posters and charts conveying information about the causes, harmful consequences and prevention/treatment of childhood obesity. In addition, 32 low calorie recipes were developed which were included in the booklet. Questionnaires were administered to the subjects before and six weeks after the parents studied the booklet. The results indicated significant positive change in the knowledge and attitudes of the parents towards childhood obesity. The 24 hour dietary recall data showed a significant increase in the intake of protein and fibre and a significant decrease in fat intake for both groups of children. The food frequency data revealed that the mean daily consumption of foods like whole cereals, whole pulses, fruits and vegetables increased significantly while sugar consumption significantly decreased. With respect to the activity pattern of children, mean daily hours

spent on energy consuming activities increased significantly while for sedentary activities the same showed a significant decline. Thus, an improvement in the knowledge and attitudes of the parents had a desirable impact on children's dietary and physical activity patterns.

PSCN39 **Women's role in improving nutritional status of the community.** *Archana Sinha.* Department of Research, Indian Social Institute, 10 Institutional Area, Lodi Road, New Delhi-110003.

The present study was undertaken by Indian Social Institute, New Delhi in the selected states of Gujarat, Bihar and Uttar Pradesh in the year 2000 seeks to examine the salient features of the identity change that emerged among the dalit women, and their sociocultural aspirations as they come from disadvantaged and deprived sections of the society, suffering from the age old stigma of untouchability with all its disabilities, and their problems and patterns of adjustments to the new situation. The total women sample of the present study included 297 of Bihar, 317 of Gujarat, and 257 of Uttar Pradesh, and of this 138 (46.5 percent) formed women from dalit section in Bihar, 186 (58.5 per cent) in Gujarat and 150 (58.4%) in Uttar Pradesh. The observable aspects have been found classifiable into four major dimensions - nutritional, social, economic, political and cultural. An analysis of comparative food consumption was made in the three states of Gujarat, Bihar and Uttar Pradesh among both the two social groups. Daily food consumption level of women was studied in terms of rice, wheat and pulse. It is revealed that for all the three types of food, that is, rice, wheat and pulse and among both dalit and non-dalit communities, it was observed that the food intake was better among the non-dalit communities (51.0%, 53.4% and 53.0%) than among the dalit communities (49.0%, 44.6% and 47.0%) respectively. The difference among the dalit and among the non-dalit women in terms of consumption of wheat, pulse and rice was found to be 8.0, 6.0% and 2.0%. The maximum difference of 8.0% was for wheat consumption and the minimum difference of 2.0% was for rice consumption. This means that rice is staple food here and there is only marginal difference of daily rice consumption for both social groups. But there is difference in pulse and wheat consumption. Wheat and pulse are considered to be the protein base for the food. Therefore, non-dalit women can afford more as compared to dalit group. Wheat and pulse do not form staple food for poor people and generally they are consumed occasionally. When district wise analysis in all the three states was done, it was observed that no significant data for Banaskantha was available for wheat consumption. In case of Bihar and Uttar Pradesh non-dalit women are consuming more than dalit women in terms of rice, wheat and pulse. When district wise analysis in all the three states was done, it was observed that in Gujarat, the women from Sabarkantha district were having maximum percentage in terms of rice (14.0%), wheat (7.2%) and pulse (7.1%) which is only next to 12.0% in Junagarh district. And it is minimum in Banaskantha district in terms of rice (4.5%), pulse (0.7%). No significant data for Banaskantha was available for wheat consumption. When the comparative food consumption was studied for all the three states in terms of various caste communities that included upper case, upper backward caste, most backward caste, scheduled caste and muslims. It has been already established that the nutritional status of non-dalit women are better than dalit women. Hence, from the above analysis it can be concluded that the overall pattern of daily consumption of rice, wheat and pulse is same among all the non-dalit women communities.

When the observations are made state wise, then it is found that in Bihar and Uttar Pradesh the economic and social situation of non-dalit women is better than dalit women but in the Gujarat state the proportion of dalit women (22.6%) is more than non-dalit women (16.6%) who consume additional food during pregnancy. This again confirms the earlier observations on nutritional status of dalit women. When the observations are made state wise, then it is found that in Bihar and Uttar Pradesh, the economic and social situation of non-dalit women is better than dalit women but in the Gujarat state the proportion of dalit women (22.6%) is more than non-dalit women (16.6%) who consume additional food during pregnancy. This again confirms the earlier observations on nutritional status of dalit women. When the above analysis is made on the basis of

various caste communities among the non-dalits, the similar trend is observed which says that the proportion of women who consume additional food during pregnancy is maximum in the upper caste community (23.0%), followed by upper backward caste (16.1%), most backward caste (6.5%) and then among muslim (2.0%) women. When analysed state wise, then also similar pattern is observed for Bihar, Uttar Pradesh and Gujarat. Therefore, the movement for social emancipation of Indian women that started in the 19th century, still have a long way to travel before it reaches its desired goal.

PSCN40 **Study of degree of vitamin'A' deficiency in 2 to 5 years age group of village girls in Maharashtra.** *Sudha Patani* & Jayshree Godse, Jr. Lect. in Dankunwar Collage, Jalna, P.G. Dept. of Home Science, Govt. Collage, Aurangabad. Maharashtra.

In India percentage of Vitamin 'A' deficiency is very high in rural area. Hence, a study was conducted by selection of a sample of 65, villages girls of 2 to 5 years age group in Gangapur Tehsil, Survey was conducted for social economic background of the families. Anthropometry and Clinical assessment of vitamin 'A' deficiency was done for dietary pattern, 8 days weighment survey. Statistical analysis was done by using x^2 (Chi Sq.) test. In this study 89% girls were of low income group, 72.5% girls mothers were illiterate, only 32% girls were haivng normal health. In this study, 76.5% girls diet was lacking in vegetables, fruits, milk & milk products. Thus the health status of girls was poor. Evaluation of diet survey and clinical assessment of the subject showed deficiency of Vitamin 'A' and other nutrients. In this study, 6.15% girls were suffering from xerosis, 2.5% from Bititspot, 1.5% from night blindness, 0.5% from Corneal ulcer and 1% from total blindness. All these values were significant at 0.1% level. These reuslts indicated that diet were deficient in nutrients. The affecting factors were illiteracy, poverty, lack of knowledge of nutrition, availability of nutritional foods, carelessness about girls health. Availability of affordable Vitamin 'A' rich foods must be improved & nurtition education to mothers should be given in rural areas.

PSCN41 **A study of dietary pattern and nutritional status on non-insulin dependant diabetic patients.** *Sameera Almas Ansari*, M.Phil Home-Science (Food & Nutrition)

The present study was undertaken with the objective to study the dietary pattern and nutritional status of non-insulin dependent diabetic patients in Indore city, in order to create awareness about the importance on nutrition and to improve the dietary pattern of them. Total 100 cases were randomly selected of the age of 40-50 years. Data about the dietary intake and nutritional status were taken by the oral questionnaire method. Dietary intake was obtained by using 24 hours recall method. For assessment of blood sugar level biochemical method was used. It was found in the results that the nutrient intake was not sufficient comparatively to RDAs. The mean nutrient intake, when compared with the RDAs, revealed that their dietary pattern were deficient in most of the nutrients. The mean consumption of the cereals and pulses were sufficient, but consumption of fruits and vegetables were very low. Consumption of meat and its products were low because most of the cases were taken from vegetarian dietary pattern Results shows that there were no awareness about the balance diet as well as food exchange list among them. They did not have the knowledge about the importance of balance diet and food exchange list in diabetes. The reasons differs from person to person.

PSCN42 **Nutritional significance and comsumption pattern of fish in West Bengal sub urban areas.** Anumita Bajpai, M.Phil Home-Science (Food & Nutrition)

The present study was undertaken with the objective to study the nutritional significance and consumption pattern of fish in West Bengal of sub urban areas, namely Serampore and Digha, in order to study about the importance of fish and it's significance. Total 220 households were selected from Serampore and 110

households were selected from Digha, which is coastal area. Pattern of fish consumption was studied in 220 households selected at random through interview method using a schedule. The selected households were from lower income group. The costal households consumed fish every day more in Digha. The varieties of fish commonly consumed in Serampore were seer, pomfret, herring, mackrel, prawn, rohu and shark. In Digha, the commonly consumed fish were sardine, mackrel, sharks, prawns, vala and netholi. The reasons in Serampore nutrition and taste were indicated as the major factors for the choice of purchase of fish and it was reverse in Digha, as availability and suited to their income was major factor in the choice of purchase. In the Coastal area the per capita daily consumption ranged between 100-250 gm and in the inland area Serampore, the per capita consumption was less than 100 gm per day. Boiling and frying were the common methods adopted for cooking in all the areas. The study showed that consumption of fish pattern and reasons are different.

PSCN43 **Comparison of energy balance of hostler and day-scholar college going girls.** Mridula Saxena & Maya Choudhary. *Mridula Saxena*, Reader, Home Science, PSSCIVE,Bhopal.

The present study was conducted to find out the difference, if any, between the energy balance of girls of Jaipur Coleges who are day scholars and those in the hostel. 301 girl students attending regular undergraduate classes were included in the study. The students were drawn from different faculties and some of them were hostlers (56) while others were day-scholars (245). Data collection was done during normal college routine days. The information about energy intake and energy expenditure was obtained for three consecutive days, of which, two were working days and one was a Sunday or a holiday. All the information was collected by personal interview through structured questionnaire. A detailed record of the time spent on various activities performed by the subjects during the three days of study was obtained using 24 hr.recall method. The time spent on different activities of a day was computed as per the multiple of BMR values given by FAO/WHO/UNU, 1985. Data obtained by the dietary survey was used to calculate the amount of raw foods consumed by each subject. Also, the amount of calories consumed by them was calculated using the food composition tables (Rao et al. 1989). The energy expended through physical activities was computed by the method suggested by FAO/WHO/UNU, 1985. Energy balance was obtained by substracting the energy expenditure from the energy intake. Hostler had an overall mean energy intake of 1930 ± 42.31 calories/day whereas the day-scholars ingested 1730 ± 18.62 calories/day. Hostlers, therfore, had a significantly higher energy intake as compated to day-scholars. The energy expenditure on the other hand showed an otherwise trend between the two groups. The hostlers had a lower energy expenditure compared to the day-scholars (1370 ± 16.98 and 1465 ± 9.57 respectively). The difference in energy expenditure of hostlers and dayscholars was significant. The day-scholars as well as the hostlers were in a positive energy balance, although the former (265 ± 20.25) had a significantly lower level of energy blance then the latter. The study, therefore, contradicts a popular belief that hostlers do not receive an adequate diet.

PSCN44 **To study the nutritional status and deficiency disorder inunder five children of Hoshangabad district.** *Sanjay Gupta*, S.C. Tiwari, Rakesh Kakkar. Dept. of Community Medicine, Gandhi Medical College, Bhopal.

To study the nutritional status and deficiency disorder in under five children, and also the influence of various socioeconomic factors on nutritional status of under five children. The study area was Hoshangabad Distt. comprising sample size of 500 families (790 under five children). The multistage sampling technique was used. Anaemia was more common problems in females as compared to males. Vitamin A,B,D, deficiency was higher in male as compared to female population. The deficiency of vitamin (A,B & D) more common in 1-5 years of age as compared to 0-1 year age group. Malnutrition was higher in rural area and in male children.

PSCN45 **Impact of vitamin a supplementation in an ICDs covered Tribal population in M.P.** *S. Bisaria Gupta,* Prabal Bhargava.

A cross sectional study aimed to evaluate the affectivity of Vit - A supplementation covered under ICDs project in tribal children and its modification if it is still found to be deficient by change in dietary habits or contents. This study was conducted to include 1000 ICDS covered tribal children living in the tribal ICDS project at Bhainsdehi tribal block in distt. Betul of M.P. A record was made of the nutritional services received with special emphasis laid on the supplementary nutrition provided and dosage of Vit. - A supplementation. A detailed ocular examination was performed to note the manifestations of nutritional deficiencies, if any. The high incidence of various grades of xerophthalmia in our studied area indicated the evident need for early and intensive intervention.

EXPERIMENTAL NUTRITION

PSEN1 **Weight and blood haemoglobin status of cancer patients undergoing different types of treatment.** *Puja Baijal* and Munira M.Husain, Govt. New Girls Post Graduate College, Kila Maidan, Indore (MP)

A sum of 90, II and III staged adult cancer patients are selected by random purposive sampling method, 30 - 30 each of receiving three major type of treatments i.e. chemotherapy (C), chemo + radio (CR) therapy and chemo + surgery (CS). Their body weight for height is measured, BMI is calculated through standard equation and Blood Haemoglobin is estimated by Cyanomethemoglobin method. Obtained results revealed that 60%, 50% and 33.33%, C, CR and CS group's patients are under weight respectively. Only 33.33% C group, 33.33% CR group and 60% CS group patients are in normal weight status. 6.66% C group, 16.66% CR group and 6.66% CS group patients are over weight also. Mean BMI so obtained of the three comparative groups are as 19.70 (3.25), 20.83 (2.98) and 19.54 (2.34) of C, CR and CS groups respectively. Mean blood haemoglobin level of the C group is found 10.22 (1.92) gm/dl with CR group has 10.45 (1.54) gm/dl and CS group has 9.9 (1.81) gm/dl. Accordingly only 6.66% (2 out 30) patients of all groups have blood haemoglobin level in normal range, 33.33%, 43.33% and 29.99% patients of the C, CR and CS groups have mild anaemia. 56.63%, 50% and 53.33% patients of the C, CR and CS groups are found having moderate anaemia. 6.66% patients of each C and CR and 13.33% patients of CS group are suffering from sever grade of anaemia. It is evidently clear from these findings that the Chemo + Surgery group is the most affected group as they are more in under weight category, their mean haemoglobin level is least among the three comparative groups and they are suffering more from moderate and severe grades of anaemia.

PSEN2 **Development and proximate principles of instant rab mix.** *Renu Mogra* and Maya Choudhry, Deptt. Of Foods and Nutrition, College of Home Science, M.P. University of Agriculture and Technology, Udaipur.

Rab, a traditional preparation of Rajasthan, is salty, thick soup like in consistency and have rich mouthful characteristic. It is prepared by boiling maize grits and / or flour in buttermilk. The traditional method of preparation is a long drawn process with low shelf life. Hence, an attempt has been made to develop an instant rab mix. To develop an instant mix, curd having 1 % acidity as lactic acid was standardised using different pure cultures for the preparations of butter milk, Maize flour of mesh size 150 microns was used for preparing rab as per traditional method. Rab was solar dried, powdered and could be reconstituted as rab when boiled in plain water for eight minutes. Mean acceptability scores of rab ranged from 7-8 scores for different organoleptic characteristics on nine point hedonic scale. Proximate composition of instant rab mix

was moisture 4.15g, Protein 15. 86g, Fat 6.44g, Carbohydrate 67.34g, Fibre 1.75g, Ash 3.31 g and Energy 295.80 Kcal per 100g. Thus, it could be said that the rab mix developed is nutritious, acceptable, reconstituted within few minutes and can be consumed by all age groups.

PSEN3 **Study the relationship between malnutrition and infectious diseases in children under 5 yrs. age admitted to Abuzar hospital, Ahvaz, Iran.** *Husain D.*, Nutrition Dept. Paramedical College, University of Medical College, Ahvaz, Iran.

Infectious diseases in children are closely related to malnutrition and nutritional status of the child. One of the various ways to assess nutritional status and malnutrition in the community is the cases admitted to hospital in one year, so we collect data from Abuzar children hospital, Ahvaz. Aims of the study were to obtain information about malnutrition and its effect on nutritional status of the children under 5yrs. age and assess infectious diseases. Cross sectional research method used to collect data and type of study was descriptive analytic. Cases admitted to the abusar hospital from 97 to 99 was 4811, from that 210 cases were malnourished and infected with infectious diseases. Recent study indicates that 53.7 % children were infected with gastroenteritis, 25.3% respiratory infection, 13.9% urinary infection and 7.1 % sepsis. Results show significant relationship between infectious diseases and malnutrition <0.00006 and as well as in gender $p<0.001$.

PSEN4 **Nutritional profile of mother infant pair during first six weeks of lactation.** *Shalini Sharma,* and Maya Choudhry. Department of Food and Nutrition, College of Home Science, Maharana Pratap University of Agriculture and technology, Udaipur, Rajasthan.

Nutritional profile of thirty mother infant pair from government hospital Udaipur, Rajasthan was studied semi longitudinal during first six weeks of lactation. Results revealed that diet of the women was adequate or more than adequate in all the food except cereals (40-60%) when compared with balanced diet. Intake of all the nutrients except calcium (66%), niacin (59%) and vitamin C (21%) was as per the RDA. Traditional supplementary foods were providing 2% of potassium to 41% of zinc in daily diet. Weight of the women and BMI ranged from 51.33 kg. & 21.32 (week I) to 52.62 & 21.86 (week VI) indicating normal nutritional status. Skinfolds increased at all the sites with the advancement of lactation. Body fat, fat free mass and body water were 14.30 - 15.73 kg., 36.87-37.04 kg, and 26.99-27.11 kg. respectively during first to six weeks. The increase in body measurements, component and food & nutrient intake during six weeks was non significant ($P>0.05$). Weight and length of infants increased significantly ($P>0.01$) during the study period and were more than 90% of NCHS standards. Normal nutritional status of mothers as well as infant along with breast feeding emphasizes the importance of traditional supplementary food in daily diet's of lactating mothers.

PSEN5 **"Comparison of nutritional status among thalassemic and normal children of Indore".** *Priyanka Thakur*,* and Nandini Sarwate**.* Dietitcian in Charak Hospital Pvt. Ltd.,** Professor, New G.D.C. Indore.

Thalassemia syndrome are a group of inherited disorder and through this study, some facts were learned about "Thalassemia". In above study total number of selected samples were 60, both male and female. Out of 60 - 30 were Thalassemic and 30 were normal. A general information on education, income, occupation, no. of family members, history of disease, were collected. Nutritional status was assessed by anthropometric measurements, biochemical measurements, clinical signs and symptoms, food habits, 24 hours dietary recall was done. From the study it was concluded that, Thalassemia is a genetic disorder, occurs in all socioeconomic groups, in all blood groups. The nutrient intake of Thalassemia were much less than the normal

children, for ex.: the mean calorie intake was only 744.5 to 1448.05 kcal, protein was 22.55 gm to 49.16 gm., fat was 20.67 gm to 44.89 gm., cho was 106.09 gm. To 200.48 gm. Thus less food intake leads to nutrient deficiency, low immunity power and slow growth. These children have to be kept on regular blood transfusion for proper physical appearance, growth and to maintain Hb level upto 10-11gm/dl. Blood picture was similar of all Thalassemic children. These children required iron chelating agents to prevent iron overload like vit-c was common. Thalassemic children suffer from anorexia and were supplemented with vit-B12 and folic acid to prevent anaemia.

PSEN6 **Prevalence of anemia among adolescent girls (13&14 yeras) of Bikaner city (Raj.)** *Anjana Kothari* and Vimla Dhukwal, College of Home Science, Rajasthan Agricultural University, Bikaner.

The present study was conducted on adolescent girls of Bikaner City. 100 subjects were selected from each economic group i.e. LIG, MIG and HIG. The results revealed that the mean haemoglobin levels of all the subjects for the three income groups were below the normal values as suggested by W.H.O. It was 77.41 and 74.61 percent of the normal values for all three income groups of 13 and 14 years respectively. Greater percentage of the subjects in LIG was severely anaemic as compared to their MIG and HIG counter parts. Categorization of the subjects on the basis of attainment of menarche and haemoglobin content in blood revealed that greater percentage of the subjects of all income groups were severely anaemic in postmenarcheal group, where as mild degree of anaemia was found in higher number of premenarcheal adolescent girls in all income groups. A comparison was made to find out the impact of BMI on haemoglobin level, and was observed that greater percentage of the subjects among malnourished was anaemic.

PSEN7 **Nutritive value of cereal based recipies.** *Bhatnagar V.*, Jain,S., Chelawat S. and MathurP., All India Co-ordinated Research Project. Department of Foods and Nutrition, College of Home Science. MPUA & T. Udaipur.

Diet surveys carried out among urban & rural families indicate the use of wide variety of recipies. Looking into the paucity of data on nutrient data base of cooked recipies, the present study was undertaken to assess the nutrient composition of commonly used recipies based on cereals. Total twenty one recipies including wheat (15) and rice (6) were analysed for proximate composition, iron and calcium contents. Results are presented on 100 g cooked weight basis. Halwa, a sweet preparation of whole wheat flour showed maximum fat content (13.1 g) and minimum protein content (3.8 g) in comparison to chapati, parantha, puri and baati. Among the preparation of cracked wheat highest value was obtained in dalia (7.4 g), whereas lowest value for fibre was in upma (0.15) prepared from wheat semolina. Amongst refined wheat flour preparations, kachori was found to be richest in energy content (486 Cal) due to high amount of fat Bread, biscuit, and maggi were devoid of fibre, Bread pakoda had good protein content (15.4 g) due to addition of besan. Sweet biscuit showed maximum calcium (120 mg) and iron (9.8 mg) contents. On comparing various preparations of rice, it was observed that composition of plain rice with and without water strained was almost same Due to low moisture content puffed rice was found rich in protein, calorie calcium and iron contents. Idli, a fermented product of rice and pulse was observed as high protein (6.2 g) with low fat (1.1 g) and low calorie (164 Cal) food. Such nutrient data base will help in planning diets for various groups.

PSEN8 **Evaluation of an arid vegetable, sangari (*Prosopis cineraria)*** *Anjula Swami** and Madhu Goyal**, *Department of Foods and Nutrition,College of Home Science,Rajasthan. *Agricultural University, Bikaner(Raj.)

The arid vegetable sangari *(Prosopis cineraria)* was studied for its Nutritional composition and method of drying. While standardizing drying method, the best pre-drying treatment was found to be blanching of sangari

in solution containing 0.1 % magnesium oxide , 0.1 % sodium bi-carbonate and 0.5 % potassium meta bi-sulphite. Between open sun and shade conditions, shade dried samples were found to be better acceptable. Nutrient analysis revealed that 100g. of fresh sangari sample contained 72.20g. moisture, 5.09g. crude protein, 0.52g. fat, 14.15g. total carbohydrate, 6.7g. crude fibre, 1.33 g. total ash, 81.61 calore energy, 0.408g. calcium, 0.046g. phosphorus, 0.481g. iron & 0.264g. sodium. The values of crude protein, fat, total carbohydrate, crude fiber, total ash, energy, calcium, phosphorus and iron found to be statistically unaffected due to pre-drying and drying conditions.

PSEN9 **Aloe barbadensis : Proximate composition, product development and sensory evaluation.** *Shilpi Sharma* and Navita Pareek, Banasthali Vidyapeeth, Banasthali, Rajasthan - 304022.

A study was undertaken to find out the nutritional composition and standardized various products of arid vegetable *Aloe barbadensis* (Guarpatha). Nutrient analysis revealed that 100 g. of fresh *Aloe barbadensis* sample contains 97 g. Moisture, 3.2 g. protein, 3.2 g. fat, 0.65 g. mineral ash, 15.20 g. fiber, 79.04 g. total carbohydrate, 355 K cal Energy, 80 mg. calcium, 9.40 mg. iron, 198.93 mg phosphorus and 132.16 mg glucose. Except for vitamin c and glucose all other nutrients were calculated on dry weight basis. Aloe products were standardized, using results of community survey and sensory evaluation techniques. Results indicated that Aloe biscuits, jam, laddu, parantha, pickle, squash, and vegetable were found to be well acceptable as scores ranged from 3.05 to 4.20 on five point scale. Based on the results, it can be concluded that *Aloe barbadensis* leaves are nutritious and abundantly available arid vegetable with a wide scope for acceptable product development.

PSEN10 **Hypoglycemic and hypocholesterolemic effect of fenugreek seeds on non-insulin dependent diabetes mellitus.** *Jesupriya* and Sasikala, Vellalar College for women, Erode.

Fenugreek (Trigonella Foenum graecum), a native of the mediterranean region, have been used medicinally since ancient times. Non - insulin dependent diabetics between the age group of 35-65 years having the fasting blood sugar level ranging between 120 to 150 mg/dl and serum cholesterol level 222 to 256 mg/dl were consumed a dosage of 10g of fenugreek seeds per day for 2 months. ft was found that there was a significant reduction in mean fasting blood glucose levels and mean serum cholesterol level from the initial values of 174 mg/dl and 221 mg/dl to 157 mg/dl and 192 mg/dl respectively after the intake of fenugreek seeds. There was no marked reduction in these levels of control group where the subjects were not supplemented with fenugreek seeds The mean glucemic index of the funugreek seeds was found out using bread as the reference food and it was 44. A member of leguminosae family, the seeds of Fenugreek plant contain about 50% fibre of which 20% is mucilaginous fibre. The protein fraction contains the amino acid, 4-hydroxy isoleucine, which has been proven to stimulate a galactomannan gel component which acts as a hypoglycemic agent. Saponins present in fenugreek have been proven to reduce cholesterol levels.

PSEN11 **Biochemical profile and cardiovascular risk assessment among pre and postmenopausal women.** *T.Poongodi*, Vijayakumar, Jemina Beryl Mohankumar, Vellalar college for women, affiliated to Bharathiar University, Erode, Tamilnadu.

An investigation on cardiovascular risk levels and correlation of antioxidant vitamin status over lipid profile was carried out among premenopausal and postmenopausal women who belonged to sedentary work, middle Income group (HUDCO classification); urban and rural area of Erode District. A risk assessment

scale was developed on the basis of identified CVD risk factors (maximum score 40). On the basis of total score, all selected premenopausal women and 66 percent of postmenopausal women were categorized in low risk (score range 11- 20) and 34 per cent of postmenopausal women was categorised in moderate risk (score range : 21- 30). On validation of reliability of scale, serum lipid fractions of all women belonged to LRG were within normal limits and postmenopausal women who belonged to MRG had mean serum. TC level (< 200mg/dl) and mean LDL- C level (> 130mg/dl) above the normal and mean HDL - C level (> 50mg/dl) below the normal. Correlation coefficient revealed a significant negative correlation between risk score and serum HDL-C level, while other lipid parameters such as TC level, LDL-C level, VLDL-C level, TG level, TC/ HDL ratio were significantly positively correlated. There was also a significant negative correlation between antioxidant vitamin A and C level and TC level, LDL-C level, TC/HDL ratio. Thus the study reavelaed that CVD risk were closely related to high TC and LDL-C level, low HDL - C and antioxidant vitamin A and C level and menopause state.

PSEN12 **Linkages of antioxidant status with the degree of oxidative stress & opacity of lens in Indian cataract patients.** *Kirtan Tarwadi* and Vaishali Agte Biometry & Nutrition Group, Agharkar Research Institute, G.g. Agarkar Rd, Pune - 411004

Status of antioxidant metals and oxidative stress in plasma and extracted lens was assessed for 80 cataract patients and in plasma for 40 age-sex matched controls. Ratio of soluble to total proteins (S:T ratio) and turbidity of the lens homogenate as O,D. at 550nm were taken as measures of lens opacity. The order of oxidative stress as MDA equivalents in plasma for cataract patients was HIG women > LIG women > LIG men > HIG men > control men and women. The lens turbidity was associated with serum ceruloplasmin (r, -0.407 $p < 0.05$). MDA and S.T. ratio in lens, were highly correlated (r, -0.51) indicating direct effect of Oxidative stress on lens opacity. The levels of selenium in plasma were correlated with the S.T ratio (r- 0.363, $p < 0.05$) while the associations with lens zinc were significant for turbidity, of lens (r, 0.24 $p < 0.05$). The patients as well as controls had low levels haemoglobin (11.1-13.3g%) and ceruloplasmin (19-23 U/L). Cataract patients had significantly ($p < 0.05$) lower levels of ceruloplasmin than the controls (16.8 VS. 23.9 U/litre). Levels of lens zinc (12.04 ppm) were comparable and that of copper (1.13) were higher than the reported values by Sethi etal (1989).

PSEN13 **Nutrient composition of iron rich ready-to-mix (rtm) powder developed from lotus stem.** *Poornima Sharma* and Shashi Jain, Department of Foods and Nutrition, College of Home Science, Maharana Pratap University of Agriculture and Technology, Udaipur 313001. INDIA.

Iron deficiency anaemia is prevalent globally in about 50 to 70 percent population affecting all walks of life. Poor absorption and insufficient intake of iron from the predominantly vegetarian diet are the primary causes of iron deficiency. The iron content in lotus stem was estimated to be 80.5 mg/100g but it's use in daily diet is restricted due to higher content of fibre. Hence the present investigation was undertaken to develop an iron rich powder by processing the lotus stem. This developed powder can be added at the time of serving. Estimation of nutrients revealed that before processing lotus stem powder contains 4.46g protein, 5.96g ash, 3.33g crude fibre and 78.24g carbohydrate providing 335 Kcal per 100g on dry weight basis whereas, after processing of lotus stem, i.e. in developed RTM powder the values were protein-1.48g, ash-6.74g,crude fibre-0.23g and carbohydrate- 87.38g providing 360 Kcal. The iron contents of this powder estimated using atomic absorption unit was 105.02 mg/100g. These values indicates a marked increase in carbohydrate and iron content and reduction in crude fibre in developed powder. Invitro iron bioavailability was estimated to be 94.46 per cent showing that lg of powder provides 1.04 mg of iron. These results reveals that by the processing of lotus stem the iron density can be increased which may have potential effects in overcoming the anaemia.

PSEN14 **Relationship between birthweight and biochemical measures of maternal nutritional status at delivery in urban poors.** *Kamal G. Nath,* Department of Rural Home Science, University of Agricultural Sciences, Hebbal, Bangalore.

A cross-sectional study was carried out to investigate relationship of birth weight with selected biochemical indices of nutritional status of mothers at delivery in poor urban population. One hundred and fifty one pregnant women of known gestational length, aged 20-30 years, who attended a local maternity hospital for delivery participated in the study. All of them were free from any pregnancy complications or diseases and delivered a signleton full term baby. Socio economic and obstetric history were taken by interview. Anthropometric data and blood samples were collected on the same day. Twenty percent of the subjects were anaemic (Hb <111.0 g/dl), forty nine percent had subnormal (< 4.0 g/dl) serum albumin and 32.5% had serum vitamin A lower than adequate level (< 30.0 mg/dl). Mothers who gave birth to low birth weight babies had lower levels of haemoglobin (P=0.06), serum albumin (P=0.02) and serum vitamin A (P=0.05) at delivery compared with the mothers who gave birth to normal weight babies. After adjustment of various confounding factors, only serum albumin level remained significantly lower in the mothers of low birth weight babies. Using multiple regression analysis for birth weight, the overall F ratio was calculated to be 12.5 and was highly significant (P=0.0000). The adjusted R2 was 0.32. Gestational age, father's occupation, mother's body weight and serum albumin level were found to have significant independent effect on birth weight.

PSEN15 **Anaemia and adverse obstetric outcome.** *Kamal G. Nath,* Department of Rural Home Science, University of Agricultural Sciences, Hebbal, Bangalore.

Perinatal Mortality rate and birth weight of infants were calculated in relation to maternal haemoglobin levels at the time of delivery in 361 urban women from low income group. The mean birth weight showed a significant fall when maternal haemoglobin levels were below 8g/dl. The fall in birth weight was partly attributable to the increase in premature deliveries and partly to intrauterine growth retardation. Perinatal mortality showed a progressive increase with fall in haemoglobin levels below 11 g/dl. Analysis of data indicated that women with haemoglobin levels below 8 g/dl were more undernourished. Prevalence of maternal risk factors -associated with low birth weight were higher in anaemic women. It is thus possible that some of the adverse effects seen in association with maternal anaemia weight be attributable, to coexisting obstetric problems rather than to maternal anaemia per se.

PSEN16 **Nutritional and haemoglobin status of hill women.** *Shweta Upadhyay* and A.R. Kumar, Department of Foods and Nutrition College of Home Science G.B. Pant University of Agriculture & Technology, Pantnagar, Uttaranchal-263145

Key Words: nutritional status anaemia, haemoglobin.

Present study was an effort to know the nutritional status and haemoglobin status of hill women. A total of 228 women were studied from four villages of Nainital district. Their height, weight and haemoglobin levels were tested. Results indicated that mean height and weight were 151.20 cm & 48.93 kg BMI when calculated came to be 21.47 k g/M^2 On the basis of BMI 58.77% women were normal, 17.98% were low weight normal, 8.77% were obese grade 1, 13.16% were CED gradel and 1.32% were CED grade 2. Haemoglobin levels revealed that mean haemoglobin level was 10.44 g/dl. Majority of women (59.21%) were mild anaemic, 26.3% were moderately anaemic and only 14.47%, women were found to have normal haemoglobin levels. It can be concluded that malnutrition and anaemia is widely prevalent in hill areas and urgent attention is needed to tackle the problem.

PSEN17 **Effect of supplementation of beta-carotene and ascorbic acid on lipid profiles in cardiovascular patients.** *M Amirthaveni Subramanian* and Chadalavada Srilakshmi, Avinashilingam Deemed University, Coimbatore

Cardiovascular disease is responsible for about 40 per cent of deaths in developing countries. Simple accessible and cost effective preventive therapies that decrease the incidence of CVD could greatly effect public health, substantial interest has recently focused on the hypothesis that the naturally occurring antioxidant vitamins such as vitamin E, C and Beta-carotene may prevent myocardial infarction, progression of coronary heart disease or strokes. It is probably the right time to take of fresh look at the diets consumed by our population and formulate appropriate dietary guidelines to prevent and control these disease. The objective of the study was to find out the effect of supplementation of beta carotene and ascorbic acid on the lipid profile of selected CVD patients. Information on age, sex activity, dietary pattern, BMI, family history risk factors, types of disorders and associated symptoms were collected from 200 patients. Ten patients were supplemented with 500 mg of spirulina containing 600 micrograms of beta-carotene (Natoxid tablet) and the other ten were supplemented with 600 micrograms of Beta-carotene and 500 mg of ascorbic acid (Celin tablet) per day for a period of 60 days. Supplementation of beta- carotene alone and beta carotene ascorbic acid was highly effective in reducing the total cholesterol, triglycerides and LDL cholesterol and is also effective in increasing the HDL-cholesterol. However it is not helping for the reduction in VLDL-cholesterol. Effective dietary counselling and supplementation of betacarotene and ascorbic acid to CVD patients can help them to control and prevent heart disease.

PSEN18 **Hypoglycemic and hypocholesterolemic effect of selected herbal powders.** *Vasanthamani. G.*, and Savita D., Department of Food Service Management and Dietetics, Avinashilingam Deemed University, Coimbatore.

A study was conducted to find out the beneficial effect of three herbal powders namely sprouted fenugreek seek powder (Trigonella foenum graecum), kasini powder (Cichorium intybus) and kizhanelli shoot powder (Phyllanthus niruri) in reducing the blood glucose and blood lipid levels. Twenty-four non-insulin dependent diabetics in the age group of 40 to 70 years were selected from two hospitals in Coimbatore and were divided into 4 groups of 6 subjects each. The first three experimental groups were administered with sprouted fenugreek seed powder (25g), kasini powder (10g) and kizhanelli shoot powder (10g) per day respectively in three divided doses for 15 days. The fourth group of 6 subjects did not receive any treatment and were designated as the control group. The subjects were requested not to take any hypoglycemic drugs. An interview schedule, 24 hour recall survey for three consecutive days, anthropometric measurements like measurement of weight and body mass index and biochemical indices such as blood glucose and blood lipid levels before and after the administration were the parameters used to find the socioeconomic, dietary and health profile of the selected subjects. Of the three herbs tested, sprouted fenugreek seed powder has shown the greatest beneficial effect followed by kasini powder and kizhanelli shoot powder.

PSEN19 **A study on the prevalence of malnutrition (PEM) among the patients suffering from tuberculosis in Bundelkhand region of Uttar Pradesh.** *Sangeeta Khare,* Consultant Dietician, Nirmal Hospital, Jhansi (U.P.)

Tuberculosis & malnutrition travel hand in hand. Infection due to tuberculosis causes loss of weight and wasting. Insufficient food increases the risk of Infection and then spread of tuberculosis. Tuberculosis is the largest prevalent disease in the community and has been one of the greatest killer in human history. Poor nutritional status is the important cause of the disease. The present study was based on hypothesis that PEM

is widely prevalent among the patients having tuberculosis in Bundelkhand area. Even with the use of effective Anti Tubercular Treatment (ATT), recovery rate is very slow or not at all. The prevalence was expected to be more than 95% in this area. The objective of the study was to assess the nutritional status of patients admitted in the hospital for treatment and to provide them proper diet counselling to fulfill their nutirtional requirments within the common food articles avaliable at their door step. A well framed questionnaire was used to elicit information regarding age, sex, family size, Income, dietary pattern, nutritional status BMI and current weight loss. Two hundred patients were assessed for the study. Their TLC, DLC, Haemoglobin, serum calcium, serum albumlin was done at the time of admission. The result indicated gross weight loss (more than 20 to 25 kgs.) A marked decrease in lymphocyte count, serum albumin, serum calcium and haemoglobin was seen. BMI was found to be even less than 10 in some cases. The main causes were found to be poverty, lack of nutrition education, loss of appitite etc. Finally it was concluded *"whether the malnutrition is due to tuberculosis or tuberculosis is due to malnutrition"*.

PSEN20 **Changes in body composition and energy costs with age in women (30-60 years).** *Anupa Siddhu,* Monika Wasuja and Raksha Sirohy, Lady Irwin College, Sikandra Road, New Delhi.

Age brings about enormous changes in the physiological status of women. An investigation was carried out to explore decade-wise changes in body composition and energy costs of activities in women from 30 to 60 years.Body composition was assessed using Tanita Body Composition Analyser (TBF-300) on a total sample of 75 women with 25 women in each age group of d3 (30-40y), d4 (40-50y) and d5 (50-60y). Energy costs of seven standardized activities were measured using OXYLOG II on a sub sample of 20 women in each age category. There was a significant ($p<0.01$) difference in the energy costs of active sitting, walking and walking with load. In other activities too (sitting, standing and active standing), the costs were higher for older age groups as compared to the younger one (d3<d4<d5) but the difference was non-significant. Body mass index demonstrated a progressive increase from 25.35 ± 3.8 kg/m^2 in d3 to 28.7 ± 4.4 kg/m^2 in d5. Body fat% showed a marked increase from d4 (37.5 ± 8.5) to d5 (44.0 ± 9.5) indicating a strong role of menopause in changing body composition with age. FFM, however, did not reveal any trend amongst the age groups. The reason for higher energy costs in d5 could be attributed to higher body weights, poor mechanical efficiency or reduced physical activity. Thus, the present study established age-related change in energy cost of activities and body fat per cent and pointed towards having a discrete decade-wise database on energy cost of activities.

PSEN21 **A study of relationship between dietary profile and blood lipid level of coronary heart disease patients in Gwalior.** *Shailja Jain,* Department of Home Science, Govt. K.R.G. P.G. Autonomous College, GWALIOR.- 474 001

Coronary Heart Disease (CHD) is a leading cause of death in elderly. The present study is an attempt to assess the relationship between incidence of Coronary Heart Disease and (a) educational status of people, (b) dietary intake. Fifty normal without CHD (Control group) and one hundred elderly male and female subjects with CHD in the age group of 55 - 65 years were randomly selected from various localities and private nursing homes / hospitals of Gwalior respectively. General information was collected through questionnaire. Dietary profile was noted by 24 hour recall technique for 3 consecutive days. For estimation of Blood Lipid Profile, kit method was used. The statistical analysis of study is not yet complete. Preliminary analysis indicates the following trends: - Majority of the subjects belonged to high or upper middle income group, Intake of major nutrients like calories, proteins and carbohydrates is not adequate as per, RDA in both the groups. Intake of fibers was higher in control group. Normal subjects were more physically active than CHD patients. Blood Lipid Profile is directly associated with dietary intake of saturated and unsaturated fats.

PSEN21 **Role of food fortification at small scale for combating malnutrition.** *L.K Sinha*, T. Patil. Jai Vigyan - National Agricultural Technology Project on Household Food and Nutritional Security, Soyabean Processing and Utilisation Centre, Central Institute of Agricultural Engineering Nabi Bagh., Berasia Road., Bhopal 462 038., India

More than 40% of the population of the country lives below poverty line and suffers from malnutrition. Protein calorie malnutrition is the major macro nutritional deficiency in our country and about 55% children are suffering from this. Less visible than protein calorie malnutrition, are deficiencies of micro nutrients and major ones are from iodine, vitamin A and iron. During the survey of villages it was observed that protein calorie malnutrition is common in the rural areas. Though soybean is grown in these areas, growers are not aware about the advantages of soybean as nutritious food and do not know how to process and consume it. As wheat flour is the major item consumed, fortification of this with full fat soy flour for increase in protein content and fortification with vitamin plus mineral premix are proposed. To facilitate protein fortification the rural women were trained in preparation of soyflour using kitchen gadgets. For popularization of fortification with vitamins the most popular carrier or medium will be cereal flour. Hence one day meet was organized for small scale miller's where nutrition expert, doctors and technology experts made them aware on various aspects of flour fortification with macro as well as micronutrients. They were advised to fortify wheat flour with full fat soy flour initially and with iron and vitamin A at latter stage. To ensure the availability of soy dhal, the NATP-HFNS has promoted small rural entrepreneurs. Grinding of a 10.90 mixture of cleaned, dehulled and hydro-thermally treated soy bean and washed & dried wheat can result in soy fortified wheat flour which will have protein content of about 20%. Flour made by grinding at enhanced level of soy fortification (at about 15-25%) is highly beneficial to diabetic persons. A local baker has started manufacturing and marketing of soy-fortified biscuits using CIAE technology. These efforts have started showing the improvement in nutritional profile and economic status of the targeted group.

PSEN23 **Carotene content of commonly consumed vegetables subjected to dehydration,** *Balasasirekha R.*, Kowsalya, S. and Usha Chandrasekhar, Department of Food Science and Nutrition, Avinashilingam University, Coimbatore - 641 043, Tamil Nadu, India.

The total and beta carotene retention in selected commonly consumed vegetables subjected to various dehydration methods was studied. The vegetables selected for the study included carrot, pumpkin, sweet potato and yam. The dehydration methods selected for the study were sun drying, oven drying, microwave drying, vacuum drying and solar drying. All the vegetables were estimated for its moisture content, total carotene and beta carotene in their raw and dehydrated forms. The total carotene was analyzed using spectrophototmetry and beta carotene using high performance liquid chromatography. Results indicated that microwave dried samples had a maximum retention of 94 and 91 per cent of total and beta carotene respectively. The retention of total and beta carotene varied significantly ($P<0.01$) between methods of dehydration. Among the vegetables, sweet potato and yam retained 56.8 and 50.2 per cent of beta carotene. Microwave dried carrots retained 93.4 and 89.8 per cent of total and beta carotene. Since retention is high in microwave drying it can be recommended for industrial processing. Though sun drying retained 30 per cent of carotenes, addition of 22g to 32g and 33g to 47g of dried vegetable is sufficient to meet the Recommended Dietary Allowance for beta carotene in children and adults.

PSEN24 **'In vitro' starch hydrolysis and glycemic effects of processed kodo millet *(Paspalum scrobicuatum)* Products.** *Lakshmy Priya S.* and Rashmi Kapoor, Sri. Sathya Sai Institute of Higher Learning (Deemed University), Anantapur, Andhra Pradesh.

A study was undertaken to evaluate the "In vitro' and 'invivo glycemic' response of 'Kodo' millet products. Four products, viz. 'idli', 'roti', 'porridge' and sprouts were prepared using different processing methods of fermentation, baking, boiling and germination . 'In vitro' rate of starch hydrolysis was assessed using enzyme (amyloglucosidase) incubation of starch content and observing the release of glucose at periodic intervals (0, 30, 60, 90 and 120 minutes) over 2 hours period. For 'in vivo' response the products providing 40g carbohydrate were administered in non-insulin dependent diabetic human subjects and post-prandial plasma glucose levels were assessed over a period of three hours. In vitro starch hydrolysis of processed samples was significantly lower than the untreated samples. Amongst the different treatments , the release of glucose was significantly lower in 'porridge' followed by sprouts, 'idli' and 'roti'. Preparations involving baking ('roti') and germination (sprouts) produced lower glycemic responses than 'porridge' and 'idli' preparations in non-insulin diabetic subjects; the difference being attributed to the amount of resistant starch. Overall, the results of the glycemic response by feeding different 'Kodo' millet products revealed a potent glucose lowering action of 'Kodo' millet.

PSEN25 **Effect of zinc supplementation on plasma leptin status of women mountaineers at high altitude.** *Shoba Suri*, Som Nath Singh, Ashok Salhan and W. Selvamurtliy, Defence Institute of Physiology and Allied Sciences, Timarpur, Delhi-1 10054

Reduction in energy intake leading to loss of body fat as well as lean body mass is well documented during trekking at high altitude (HA). There is an increase in plasma leptin levels at HA associated with loss of appetite and acute mountain sickness (AMS) and it is speculated that this ob gene product may have a role in disregulation of energy balance at HA by acting as a signalling molecule. Zinc is also reported to have key role in development of anorexia and there are increased urinary losses of zinc at HA. Exercise induced weight loss, decrease leptin levels and improve physical performance. Keeping these findings in view present study was undertaken to investigate changes in leptin and zinc status of female mountaineers and effect of zinc supplementation. Plasma leptin, zinc and enzyme activities of alkaline phosphatase (EC 3.1,3.5) and 5' nueleotidase (EC 3.1,3.1) of 25 women mountaineers (age 17-25 y) were studied' at 8000 feet for basal data. They were then divided into two groups i.e non - supplemented control (n=7) and supplemented with zinc sulfate at dose 15 mg/day for 21 days (n=18) and all variables were analyzed again at HA (17,000 feet) and on return. Basal leptin level for both the groups combined was 3.12 ± 0.57 ng/ml (Mean ± SE) which is in lower range for females and this very well correlates to their mean body mass index (kg/m^2). i.e 20.5 and probably due to increased physical activity levels. Plasma leptin levels were found increased by 24 and 58% respectively at HA and after return in case of control group whereas in case of zinc supplemented group there was a decrease of 20% at HA in comparison to basal values. There after levels were maintained at baseline. Supplemented group did not show any loss of appetite at HA. There was no significant change in zinc status of control group as indicated by plasma zinc as well as maintained activities of alkaline phosphatase and 5', nucleotidase in the present study. On the other hand, supplemented group showed increase in zinc status at HA which was evident by all variables. On return from HA plasma zinc levels were low in comparison to HA but still higher than that of basal. At this stage enzymic activities were on higher side in both supplemented and non supplemented groups, may be due to haemoconcentartion. The dietary zinc intake was found to be 14.5 mg/day which is adequate at sea level. Results indicate beneficial effects of zinc supplementation by decreasing leptin levels at HA.

PSEN26 **pH changes in milk sold in polyehelyne bags during storage for twenty four hours.** *Aruna Deshmukh,* Sandhya Joshi and Meghna Deshmukh, Matoshree Vimalabai Deshmukh Mahavidyalaya, Shivaji Nagar, Amravati 444603, Maharashtra.

Milk contains most of the nutrients needed for the human beings. A large proportion of the milk is brought to the local processing units where it is processed and sold. Curdling during boiling is the only criterion used to confirm the consuming quality. Curdling takes place due to growth of acid producing microorganisms. With this background, a study mentioned in the title was conducted on milk samples brought from the local shop of Amravati city. Twelve samples were stored in refrigerator and twelve were kept at room temperature. Fresh milk samples obtained from local dairy served as control Two hourly pH changes were noted from both the samples with the use of pH meter of 24 hours. It was observed that pH of control milk samples dropped earlier as compared to the brand samples kept in refrigerator as well as at room temperature. The same experiment repeated on boiled milk samples also gave the similar results. Curdling of control samples kept at room temperature could be observed visually quite earlier than brand samples possibly due to the intentional addition of sodium-bi-carbonate useful for neutralizing the acids produced by microorganism. Sodium is harmful for heart patients, children and people with G.I. It is concluded that adulteratin of milk by adding sodium-bi-carbonate to extend shelf life of milk posses a serious health problem. Hence, consumer awareness is necessary regarding this type of milk adulteration at mofusils.

PSEN27 **Impact of administration of spirulina on the iron status of anaemic adult women.** *V. Anuradha* and A. Anitha, Department of Food Service Management & Dietetics, Avinashilingam Deemed University, Coimbatore - 641043

Iron deficiency and its resultant anaemia is currently the most widespread micronutrient deficiency in the world. Aanemia is also one of the considerable problems of public health in India. Many novel food supplements are being developed to combat anemia. One of them is spirulina - "the wonder gift of nature". The impact of administration of spirulina on anaemic adult women was studied. Twenty-four subjects who were moderately anaemic were selected for the study. Twelve subjects constituted the control group and twelve subjects constituted the experimental group. Eight capsules of spirulina, which had an iron content of 2.98mg, were administered to the experimental group subjects for a period of 90 days. The impact of administration of spirulina was studied by estimating the haemoglobin, serum iron, total iron binding capacity and serum ferritin levels. Administration of spirulina improved the nutrient intake and brought about a significant reduction in body mass index. There was significant reduction in the number of symptoms of anemia. There was a significant rise in serum iron levels, TIBC and serum ferritin levels of the experimental group subjects.

PSEN28 **Clinoepidemiological study to evaluate the ocular diseases in a tribal area of MP.** *Vivek Som,*

This study aimed at evaluating the prevalence of ocular diseases related to nutrition in a tribal population to plan out interventions. This cross sectional study included 1000 ICDS covered tribal children between 0-6 yr. The children were subjected to detailed ocular examination under torchlight and binocular loupe. The nutritional habits and status, the socioeconomic, associated diseases, environment and the supplementation program of the patients were taken into account. It was found that of the 1000 children evaluated 13.3% showed manifestation of nutritional deficiency, 8.1% had diseases of infective origin, 3.5% had congenital defect, 1.1% traumatic and 1% had ocular deviation. This study thus highlighted the high incidence of preventable, nutritional deficiency related ocular manifestations still existing in the tribal area and the need for change in the nutritional habits and intensifying and refining our supplementation and mass health awareness programs to achieve maximum penetration and coverage in the targeted population.

PSEN29 **Xerophthalmia : A clinicoepidemiological study in tribal children from Madhya Pradesh.** *Vivek Som.*

The present study aimed at establishing a baseline data of the existing problem of xerophthalmia for future interventional programs, was conducted at Bhainsdehi - a predominantly tribal area in the district of betul in southern part of MP. The survey included 563 households and 1053 children between 0-6 yrs. of age. The target population was studied to note the prevalence and severity of xerophthalmia. The nutritional status of the children was assessed and correlation made with the ocular manifestations of nutritional deficiency. A total of 133 children were identified with clinical features of Xerophthalmia. They were graded as per the revised classification of xerophthalmia provided by the WHO. 53 (39.84%) presented with conjunctival xerosis (X1A) and another 47 (35.55) exhibited the characteristic Bitot's spots. Corneal xerosis (X2) could be demonstrated in 9 (6.76%) and keratomalacia (X3A + X3B) was detected in 3 children while 2 displayed corneal scars (XS). The present study indicated that the prevalence of Xerophthalmia was quite high in the area surveyed. This high prevalence was attributed to a multitude of factors.

PSEN30 **Biological analysis of groundwater under public use in Rajnandgaon distirct.** *Vasu Verma.* Govt. Kamla Devi Girl's College, rajnandgaon. (C.G.)

Water, the most abundant and wonderful natural resource, is extremely essential for survival of all living organisms. Today clean water has become a precious commodity and its quality is threatened by numerous sources of pollution. The quality is a major factor in determining the usefulness of any water supply to meet the requirements of general usage. In one way or the other we use all available sources. We pollute it, repurify it and and reuse it over and over again.Normal water is rich in bacteria, algae, viruses, protozoa worm and other organisms. The biological contaminants develop faster in water due to excess of nutrients. One of the mainpurpose of water pollution control is the prevention of water-borne disease. It is necessary to analyse bacterial pollution and its presence in drinking water. For the identification of colifor bacteria in Rajnandgaon district about hundred samples were taken from different parts and sources and these different water samples were collected in sterilized bottles. The bottles were brought to laboratory in an icebox and immediately proposed for bacteriological test. Total coliform were analyzed by Brilliant Green Lactose Bile Broth (BGLB), in the laboratory of bio-science department of Pt. Ravishankar Shukla University Raipur.

PSEN31 **Nutritional assessment of labour children (female) of a slum of Raipur Dist.** *Rashmi Minj,* Asst. Prof., Govt. Girls College, Raipur (CG)

Children from the supreme form of the wealth for a nation. Yet in developing counteries in particular and in whole world in general millions of children are trying to survive through bone breaking labour some under bondage some without bondage. The systematic study of 70 female labour labour children was carried out in a slum or Raipur district. Diet survey, anthropometric measurement, clinical examination and haemoglobin level were used for nutritional assesment. Main diet was lacking in protein, vitamins and minerals. Energy deficiency was 15%. Haemoglobin levelwas in between 8.5% to 9.5%. 19% females were having vitamin A deficiency. Socio economic data shows poor sanitation. Unhygeinc way of food preparation. Ope air defecation are the main causes of female child labour have ledt their school before primary school education. 10% female children have stopped their education after primary school and started labour work. 4% children are continuing their education along with their work. It is concluded that female child is ignored in their family and not getting proper diet and education because of their socioeconomic background, illeteracy and poverty.

OTHER CATEGORIES

PSOC1 **Psychological factors governing appetite of normal and visual handicapped children.** *Vandana Bharti* and Munira M. Husain, Govt. New Girls P.G. College, Kila Maidan, Indore (M.P.)

This paper deals about the comparative appetite of 7-12 years old normal and visually handicapped children. Both groups comprised of 150 children each. The level of appetite were observed and the subjects were asked about the conditions which changed their appetite. Obtained results indicate that the level of appetite was significantly different in comparative groups. Maximum number (78 normal and 96 visually handicapped children have had moderate appetite whereas 43 visually handicapped children had high appetite in comparison to 22 normal children. 50 normal and 11 visually handicapped children had low appetite. The conditions which increases appetite were not found significantly different. Majority of children ate more in pleasure. Appetite of children were found changed significantly ($P< 0.01$) in some conditions of psychological stress. In unfavourable conditions like, when something happens against their will, the appetite of 58 and 50, 4 and 11, 75 and 83, 13 and 6 normal and visually handicapped children were not changed, increased decreased and avoid food respectively. During frustration the appetite of 73 and 29, 6 and 12,65 and 107, 6 and 1 normally and visually handicapped were not changed, increased, decreased and avoid food respectively. During loneliness a normal and visually handicapped children respectively who have had not changed their appetite were 55 and 21, 10 and 5 increased, 73 and 114 decreased and 12 and 10 avoided their food intake. Failure have not affected the appetite of 65 and 61 normal and visually handicapped children respectively while 79 and 39, 6 and 41, none and 9 children have increased, decreased and avoided the food due to failure respectively of normal and visually handicapped group.

PSOC2 **Mean height, weight & energy balance of adolescent girls with respect to their T.V. viewing hours.** * *Mrs. Rasheeda Kanchwala,* ** Munira M. Husain, * Asst. Prof. (F & N) Govt. P.G. College, MHOW, **Asst. Prof. (F &N) Govt. New Girls P.G. College, Indore.

An investigation on impact of length of T.V. Viewing hours on the weight status & energy balance status of adolescent girls with different lengths of T.V. viewing hours was carried out. 100 adolescent girls (15 to 18 years of age) were selected from different school premises of Mhow township (Indore, M.P.) for the collection of information. The data were collected through information schedule & observation method. Queries regarding their daily routine of T.V. viewing hours, dietary intake & activity schedule were registered in an information schedule. Height & Weight were measured by standard procedure. Energy input was calculated through dietary intake & output was calculated through activity schedule. The subjects were divided into 2 categories of T.V. watchers for less than 14 hours/week & more than 14 hours/week. The result so obtained indicated that their number were 54 & 46 respectively for both the groups. The mean height levels (153.86 & 154.80 cm. resp.) of both the groups were insignificant, while their mean weights (39.52 & 45.04 kg.) were found significant at .01 level. The mean energy intake records of both the groups, (1929.50 & 2002 calories resp.) were found significant at .01 level. Their mean energy expenditure (1973.50 & 1854.50 calories resp.) were found significant at .01 level. The percentage distribution of the groups as per level of energy balanced showed that the percentage of positive balance was higher (82.60% versus 55.55%) in the group with more than 14 hours/week of T.V. viewing & the percentage of negative balance was higher (24.07% versus 8.69%) in the group with less than 14 hours/week of T.V. viewing. These result were found to be significant at .05 level. Thus the study reveals that with increasing no. of hours of T.V. viewing the body weight status increases & the body becomes in positive energy balance, due to increased energy intake & decreased energy out put which leads to over weight & obesity.

PSOC3 **Nutritional status and related etiological factors of cancer patients belonging to lower economic class undergoing different types of treatment.** *Garima Sharma* and Nandani Sarveta, New Girls Degree College, Kila Maidan, Devi Ahilya Vishwa Vidhyalaya, Indore.

The present study is an endeavour to associate the lower income group, their food practices and nutritional status with other related etiological factors on occurrence of cancer. The study was conducted on 75 patients who were randomly selected (56% female and 45% male). Information regarding height, weight, haemoglobin, food habits, dietary intake, nutritional status was gathered using schedule and 3 days dietary recall method. Cancer of oesophagus (26.6%) and Oral (13.3%) was found to effect mostly males (28%). Cervical (21.3%) and Breast (8%) cancer was found in females (29.3%). High intake of alcohol (30%), Bidi (34%) and Tobacco (42%) is responsible for cancer in Males. The haemoglobin was found to be low in maximum patients. 56% of total patients were underweight. For 75% of patients were consuming non-vegetarian diet. Unhygienic, pathetic condition, Inadequate intake of nutrients, low nutritional status, and low income was responsible to enhance the effect of disease.

PSOC4 **Nutritional status of the women in pre and post menopausal stage, of the Bikaner city (Raj.).** *Divya Kuvera* and Vimla Dhukwal, College of Home Science, Rajasthan Agricultural University, Bikaner.

The study was conducted on 200 women subjects, of Bikaner city. The women subjects falling in the age range of 40-45 years, having regular menstrual cycle were selected as premenopausal subjects and subjects in the age range of 50-55 years, having no menstrual cycle from atleast 6 consecutive months, were selected as postmenopausal subjects. The results of the present study revealed that mean intake of the nutrients, in postmenopausal group was below the recommended dietary allowances (ICMR, 1992) as well as lower than mean intake by premenopausal group. The incidence of hypertension was more prevalent in the subjects after menopause. Various menopausal symptoms related to cardiovascular, neurotic and psychotic, endocrine and gastrointestinal problems were found to be common (more than twice) in postmenopausal subjects as compared to premenopausal subjects. Results regarding biochemical assessment showed, the majority of the subjects after menopause were suffering from moderate degree of anaemia. Postmenopausal group was at borderline risk of diabetes mellitus and cardiovascular diseases. The serum calcium level in post group was significantly higher than normal values due to low intake of calcium in diet, which indicates the high risk for osteoporosis.

PSOC5 **Effect of aerobics on pre and post exercise blood pressure in normal and obese subjects.** *A.K. Sankhla*, Aarti Sankhla, Archana Sahoo and P.K. Dashora, M P U A T, Udaipur.

The study was carried out on 80 (40 normal weight and 40 Obese) willing novice cases registered at two health centres of Sriganganagar. Systolic and diastolic pressure of each individual was measured before and after one hour exercise schedule at different points of time i.e. at 0, 1, & 2 months. At baseline, B.P. of obese subjects was found to be significantly higher than that of (i) normal weight subjects and (ii) normal values. With the advancement of time, significant reduction was observed in both presystolic & prediastolic pressure of obese subjects but it failed to come to normal limits. Pre and post exercise values clearly suggest significant increase in B.P. After active involvement in one hour aerobic exercise but an interesting and expected feature which emerged out is that after two months of regular exercise, subjects gained aerobic strength as indicated by discernible reduction in average post exercise readings.

PSOC6 **Effect of temeprature and blanching on quality and drying time of dehydrated ber.** *Rekha A.Lande,* Rekha S. Taley, Deptt. of Home Science. Shri Shivaji Science College, P.O. Shivajinagar, Akola-1 (M.S.)

There is great scope for dehydrated fruits in the country provided a cheaper and more acceptable fruits like ber. The demand of dehydrated fruits in the defence for services is likely to increas in the years to come. A good export market can be built up for dehydrated indigenous fruits which are know for their exotic flavour. Keeping these points in view efforts were made to investigate the causes of loss of quality attributes due to during process, immediately after drying and during storage. A simple method has been standardized at home scale to prepare the good quality of dehydrated ber at 45°C, 55°C and 65°C (heated air drying) in comparison to sun drying using six ber cultivars (Gola, Kadaka, Mehrun, Nagpuri, Sanaur and Umran). Ber cultivars appears to have little effect on the quality of the dehydrated ber.

In sundrying depending on varieties, ber fruits blanched out at 90°C temperature for 5 minutes, took 10-13 days for drying whereas dehydration of blanched ber done at 45, 55 and 65°C temperature were dried in 84, 68, and 56 hours respectively. However the blanched ber dried at 45°C were found superior in taste. Acceptability and colour as compared to blanchus ber dried at 65°C. Considering the quality attributes, dehydration of blanched ber at 45°c and 55°C temperature is recommended. The ber dried at 65°C had unacceptable black colour associated with caramel flavour and shrunken fruits. Sun drying of ber with blanching is also recommended than that of the dehydration at 65°C. The ber cultivars Gola, Sanaur and Umran had substantially better consumer index and hence recommended for dehydration. Similarly linear relationship of order $Y = -bx + a$ has been observed with high co-rrelation coefficient between the moisture content and drying time for ber. The four equations for different temperatures and sun drying for each variety were developed on the basis of the experimental data by using least square technique. These equations have hastened the analysis work to provide the information about moisture content of a particular ber cultivar at particular drying time in days for sun drying as well as hours for mechanical drying at 45, 55 and 65°C temperature.

PSOC7 **Influence of health drink on the nutritional status and physical fitness of selected middle and long distance runners (Adolescent boys).** *Lalitha Ramaswamy,* Sivaranjani, Department of Nutrition, PSG College of Arts and Science, Coimbatore-14.

Twenty male athletes between sixteen and eighteen years were selected for the study. A health drink was formulated with germinated wheat and ragi as well as rice flakes, green gram dhal, soya bean and roasted Bengal gram dhal. The health drink was supplemented for a period of three months to all the athletes. Their anthropometric measurements, selected biochemical parameters and physical fitness tests were found out to assess the changes in their nutritional status and physical fitness before and after supplementation of the formulated health drink. The mean height and weight of sixteen year or old athletes had risen significantly after supplementation from 166.3 cm ± 4.5 to 169.8 cm ± 2.0 and 56.9 kg ± 3.30 to 59.2 kg ± 3.1 respectively ($t = 9.2$, $p < 0.05$ and $t = 3.3$, $p < 0.05$). Likewise the mean height and weight of seventeen and eighteen year old athletes had also significantly increased. The mean blood glucose level of both middle and long distance runners had increased significantly from 86.2 mg ± 8.1 to 124.6 gm ± 4.5 and 87.5 mg ± 5.1 to 124.8 mg ± 4.8 respectively ($t = 12.9$ $P < 0.05$ and 10.1, $p < 0.05$ respectively). The mean serum total protein levels, blood iron and haemoglobin levels of middle and long distance runners were significantly higher after supplementation. The biophysical tests that is pull up test, bent-knee sit-ups, sit and reach test, twelve minutes run, 50 yards dash and Harvard step test showed that there were significant changes in performance level before and after supplementation in both the categories. These results confirm the beneficial effect of the health drink.

PSOC8 **Production and consumption pattern of oils and oilseeds in selected rural farm population and its therapeutic uses.** *P. Tamilarasi Murugesan* and S. Alamelumangai, Department of Food Service Management & Dietetics Avinashilingame Deemed University, Coimbatore -3

India being an agricultural country, is one of the leading oilseeds producing countries in the world. In order to realize the practice and usage of particular oilseeds cultivated among the farm population and also to compare the effect of consumption of different oils on the blood lipid and glucose levels, the study was carried out in Coimbatore. Details regarding socioeconomic status, production pattern and utilization of oils and prevalence of diseases were elicited among the selected 650 farm households using interviews schedule. Using 24-hour recall method, the dietary pattern was studied among forty sub samples each, consuming coconut and groundnut oil. Serum lipid profile and blood glucose level was estimated using semi-autoanalyser and glucometer respectively. The knowledge and awareness of all the 650 samples on fat and oils were elicited and impact of education was studied. A majority of farmers produced and consumed coconut and groundnut oil. Among the sub samples consuming coconut oil, 24 were non-vegetarians and among groundnut oil consuming group 30 were non-vegetarians. Fat intake was surplus among all categories of farmers. Among coconut oil consuming group, only triglyceride was significant at 5% level, while among groundnut oil consumers LDL cholesterol was significant at one percent level in non-vegetarians. Nutrition education facilitated to improved their knowledge on benefits of consumption of non-conventional oils.

PSOC9 **Somatic status of employed women.** * *Sunanda Sharan* and Shashikala Puttaraj, Department of Food Science and Nutrition, University of Mysore, Manasagangotri, Mysore. * presently working at - Dept. of Rural Home Science Univ. of Agricul. Sciences, Hebbal, Bangalore, Karnataka.

Although main focus of improving the income of the women is being achieved through employment. Studies on such employment and their nutritional benefits on women are scanty. Body size of adults as measure by anthropometry is widely used as an indicator of over all nutritional status of the group. Hence, somatic status of 93 Executive (Ex-I) and 460 Non-executive (Nex-II) women employed in a public sector electronics industry in urban Bangalore district was assessed with their mean age being 33 and 44 years respectively. The women in the age group of 20-59 years on an average were 155.4 cm tall and weighed 59.2 kgs and were found to be taller and heavier compared to other studies on urban women. All the measurements (height, weight, skin fold thickness, mid upper arm circumference, mid upper arm muscle circumference) except for height showed an increasing trend with an age gradient of 20 to 49 years. Nex-II women had better protein status than Ex-I as indicated by mid upper arm muscle circumference. Percentile classification of women indicated that 61% of Ex-I to be normal and 63% of Nex-II to be overweight/obese by BMI and 46 (Ex-I) and 89% (Nex-II) to be obese by body fat % criteria. A positive correlation was obtained between BMI and % body fat and lean body mass in both the groups. The findings indicated that there might be an over all increase in the components of body composition with increased body size and advancing years.

PSOC10 **Association of waist-hip ratio and life style of male prisoners.** *Geetha, K.* and Mushtari Begum, J. Division of Rural Home Science, University of Agricultural Science, Hebbal, Bangalore - 560 024.

The present study was conducted to assess the association of Waist-hip ratio (WHR) and life style of male prisoners. The study was carried out on 310 male prisoners (20-59 years) of South Karnataka. It was found that normal subjects who were smoking prior to their prison entry and not smoking were 36 and 51 percent respectively. However, obesity percent (6.5%) remained the same irrespective of smoking habit. When the current smoking habit was taken into consideration normal subjects reduced slightly in the smoking group and increased by 2.3 percent in the nonsmoking category. Statistical differences between smoking and non-smoking in both previous and currently existing habit was found nonsignificant. Majority of previous alcoholics

were normal compared to nonalcoholic, but 87 percent who were currently nonalcoholic were normal and remaining 13 percent were obese. The obese alcoholic had higher WHR (7.1%) compared to non-alcoholics. The reason may be due to additional energy contribution from alcohol in addiction to diet, which increased intra abdominal fat. Statistical difference between alcoholic and nonalcoholic in both previously and currently existing habit was found to be nonsignificant.

PSOC11 **The radioprotective effect of two flavonoids, orientin and vicenin - a preclinical study.** *Vrinda B.* and Uma Devi P., Deptt. of Research, Jawaharlal Nehru Cancer Hospital and Research Centre, Idgah Hills, Bhopal -1 M.P.

Normal tissue tolerance is a major dose-limiting factor in radiotherapy of cancer. WR-2721, the phosphorylayed aminothiol is the best chemical protector discovered so far. But its systemic toxicity after repeated administration in cancer patients is the main hurdle in accepting it in routine therapy. We have studied the radioprotective efficiency of two flavonoids, orientin (Ot) and vicenin (Vc), isolated from Ocimum sanctum (Tulsi), and indigenously available, Indian medicinal plant. Both Ot and Vc increased the 30-day survival in lethally whole body irradiated (11 Gy, γ radiation) mice at an optimum dose of 50µg/kg body weight (intraperitoneally, 30 min before exposure). As this indicates the protection of bone marrow, a study was conducted to see the protection against radiation (1-5 Gy) induced chromosome damage and stem cell death in mouse bone marrow. Small intestine is another dose limiting organ, Therefore, radioprotective effect of Ot and Vc was also studied in mouse intestine by micro colony assay. Radiation increased the aberrant cells and individual chromosome aberrations in bone marrow cells in a does-dependent manner. Ot / Vc pretreatment significantly reduced the aberrant cells and also increased the haemppoietic stem cell survival. The small intestine also responded to treatment by significantly increasing the intestine/crypt regeneration. Thus our study indicates the radioprotection by Ot and Vc in mouse at very low, non-toxic dose. The possibility of using them in clinical radiotherapy is yet to be explored.

PSOC12 **Assessment of knowledge and attitudes of hypertensive patients regarding dietetic management of hypertension.** *Indu, Archna Chakravorty** and Usha Singh, Dept. of Food and Nutrition, R.A.U., Pusa-848 125, * Dept. of Home Science, MMV, B.H.U.- 221005

Present investigation was carried our to assess knowledge and attitude of hypertensive patients regarding dietetic management of hypertension on 90 samples in cardiac clinic in B.H.U. Hospital. The study reported that 42 (46.66%) patients were aware about 'salt restriction as a control measure for hypertension' and only 10 percent patients know about 'saturated fat as risk factor for hypertension'. Further, it was observed that respondent views about hypotensive effects of garlic, lemon and amla on blood-pressure was not highly favourable, that is only 12 (13.33%) patients had favourable opinion regarding this. However, a very high frequency (90%) of the sample had positive attitude regarding the dietetic management along with drug-treatment for hypertension. Only 10 percent of the subjects had no decision regarding it. Patients with adequate knowledge and favourable attitudes were found to follow proper preventive and control strategies. A great need of strengthening of mass media programmes for conveying the 'drug sparing potential of dietary management' had been observed.

PSOC13 **Body fat mass in relation to illness, carbohydrate, protein and fat intake in female university students (22-24 yrs.).** *Subha Roy,* M.B. Mandal* and Usha Singh, Department of Food and Nutrition,R.A.U., Pusa-848 125, *Department of Physiology, IMS, B.H.U. - 221 005

The importance of the fat content of human body is well recognized because it may influence the morbidity and mortality, after the effectiveness of drugs and anaesthetics, affect the ability to withstand cold stress

and starvation and serves as an index for health status. Higher body fat mass is known to increase the risk of cardiorespiratory diseases in elderly people. Therefore the present study was carried out in 60 unmarried volunteers of age group 22-24 yrs. to assess the relationship of body fat mass to illness, and nutrients intake. 91 per cent of the girls having low body fat mass were pure vegetarian, whereas 63 per cent having medium body fat mass were non-vegetarian and 55 per cent of the girls having high body fat mass were eggitarian. Illness like malaria, typhoid etc. in adolescent stage did ot affect the amount of present body fat mass. Carbohydrate intake was significantly less in high body fat mass group as compare to low body fat mass and medium body fat mass group. Average daily protein intake (per kg of body weight) was significantly less in high body fat mass group as compare to the low body fat mass and medium body fat mass group. The mean fat intake (per kg of body weight per day) in the high body fat mass group was significantly less as compare to the low body fat mass and medium body fat mass group.

PSOC14 **Nutritional evaluation of weaning foods developed from nutricereals.** *Sarita Srivastava* and Usha Singh, Department of Food and Nutrition, R.A.U., Pusa - 848 125

A study was carried out to evaluate the nutrient composition of weaning foods developed from nutricereals i.e. ragi, normal maize and quality protein maize in combination with green gram from pulse group and gingelly seed and groundnut from nuts and oilseeds group. For this the moisture, fat, ash crude fibre, crude protein and total carbohydrate contents were determined. The protein content of quality protein maize based warming food was found to be the highest (14.2%) followed by normal maize based (13.9%) and ragi based (11.5%) weaning food. On an average, the crude fibre and total carbohydrate content of ragi based weaning food were 0.98% and 70.85% respectively. The total carbohydrate content of normal maize and quality protein maize based weaning food were 67.64 and 67.24 per cent respectively. Out of total carbohydrate, the percentage of available carbohydrate in quality protein maize based weaning food was highest (90.60) followed by 90 per cent in normal maize based and 83.10 per cent in ragi based weaning food. Keeping the nutritional compositions in view, all the three weaning food can be given. But as the quality protein maize is having the balanced amino acid composition it should be given top priority and is recommended for four to six months old infant.

PSOC15 **Anthropometric indices of children aged 6 to 8 years consuming iodised and non-iodised salt.** *Nandini Sarwate,* Minimol K.T., Govt. New Girls P.G. College, Indore, M.P.

Anthropometry is one of the most important methods for assessment of growth and development as physical dimensions of the body are much affected by state of nutrition, especially in rapidly growing children. Height and weight are the best somatotropic traits to determine the growth pattern, particularly of the children of age 6 to 8 years. Iodine is an essential trace element required for normal growth and development in humans. The present study was conducted on a sample of 100, both male and female. Samples of one group were given Iodised salt for consumption and samples of another group were consuming non-iodised salt. The study period was for 3 months. Data regarding anthropometric indices (height and weight) were analysed by using t-test. Significant difference ($p < 0.05$) in height and weight was found in samples of both the groups. The study revealed that the mean height and weight of samples consuming Iodised salt were 113.8 cm and 16.84 kg and mean height and weight of samples consuming non-Iodised salt were 108.24 cm and 15.54 kg respectively. This study shows that the Iodine is helpful in growth even in this age group.

PSOC16 **Critical periods in early life and implications for stature growth during adolesecnce.** *Joshi Smita* and Rao Shobha Biometry and Nutrition Group, Agharkar Research Institute, Pune 411004, India.

Malnutrition in preschool age is most prevalent in rural India, and may be one of the reasons for poor adult stature. Therefore, it is necessary to investigate critical periods of growth in early life, which affect growth during adolescence. Longitudinal data on stature growth for 376 rural Indian children who were observed in preschool (1-5 yr., observed 3 monthly for a period of two years for anthropometry) as well as in adolescence (at 10^+ and 15^+ yr. for anthropometry) was analysed. Maximum prevalence of stunting and underweight (Z-score <-2) was in the age 18-24 mo in both sexes. Majority of children above age of 3 yr. who were stunted (height for age<90%) in preschool age remained stunted (60 to 70 %) even at the ape of 10^+ yr. Deficits in attained heights of normal and stunted children not only increased by fifth year but its magnitude (7 to 8 cm) seemed to remain similar up to 15^+ yr. Thus stunting appeared to be stabilized beyond third year and showed long term effect on adolescent growth and there was no scope for catch up. Efforts are therefore, required to cover all children below three years age in the ongoing nationwide intervention programmes, so that rural Indian children do not miss the 'second opportunity', offered by the adolescence.

PSOC17 **Time allocation on household activities of trained farm women under WYTEP (Women, Youth, Training and Extension Project).** Shantha Kumari, K. and Shashikala Puttaraj, Division of Home Science, Hebbal University of Agricultural Sciences, Hebbal, Bangalore 560 024, Karnataka.

Women's time allocation for different activities is of greater importance in maintaining their own health and nutritional status. It is presumed that women will have less time for household activities particularly for food preparation and child care when they are involved in gainful agricultural activities. A study was undertaken in Bangalore District with 250 farm women in which 200 were trained under WYTEP programme and 50 served as control group, to study the time spent on household activities by trained farm women. It was found that household chores like food preparation, fetching water, cleaning vessels, washing clothes, collecting fuel consumed a major share of the total time of 207 minutes on an average every day. Trained farm women spent less time of (185 minutes) when compared to control group which were spending 251 minutes, in a household chores. The trained women spent 32 minutes on child care and untrained women spent significantly more time (50 minutes) on child care. The time allocation pattern for different household activities was indicative of the fact that training motivated the farm women to spend more time in farm activities by reducing the time spent in household chores. The data revealed that involvement in farm activities tends to reduce the time available for leisure, personal care and child care. The data also revealed that when women are involved in outside job, it is likely to reduce the time spent in child care as most of the farm families were of nuclear type, the adult members available for child care activities is expected to be minimum and child care tends to be neglected.

PSOC18 **Physical characteristics of brown and white varieties of Finger Millet *(Eleusine corcana)*** *Vidyavati, H.G.*, Mushtari Begum, J., Vijayakumari, J.,Shamshad Begum, S. and Sumangala S.Gokavi., Division of Home Science, University of Agricultural Sciences Hebbal, Bangalore 560 024, Karnataka

Physical characteristics of the food grains is found to influence the cooking quality. Hence, it becomes essential to study the physical characteristics of food grains. The present study was conducted for Nine brown varieties and six white varieties of finger millet. The results revealed that, 1000 Kernel weight was found to range from 2.23 to 3.12 for brown varieties and it was 2.03 to 2.67 for white varieties. 1000 seed volume was lowest for Hullubele with 1.72 ml and highest for GPU-26 with 2.45 ml for brown varieties. For

white varieties, 1000 seed volume was a minimum of 1.6 for WRT Doopali white and a maximum for 2.25 for WRT-GE4971. The hydration capacity and hydration index was found to be lowest for Hullubele with 0.43 and 0.19 and highest of 0.98 and 0.32 for PR-202 in case of brown varieties. Among white varieties hydration capacity and hydration index was minimum for WRT OUAT-2-Kh-2000 with 0.36 and 0.14 for where as it was maximum of 0.95 and 0.35 for WRT-GE4971 Kh2000, respectively. Specific gravity ranged from 1.12 to 1.30 for brown varieties and 1.29 to 1.35 for white varieties. It was observed that, for brown varieties, grain to flour ratio was found to be a maximum of 99.41 for Indaf-5 and a minimum of 96.44 for L-5. In case of white varieties, grain to flour ratio was found to be a minimum of 96.46 for WRT-GE4971 Kh-2000 and a maximum of 98.51 for WRT-Doopali white Kh-2000. Hence, more the percentage of grain to flour ratio, better would be the quality of the grains as more of edible portion is obtained. Statistically, there was significant difference at five per cent level for all the physical parameters except for grain to flour ratio for which nonsignificant difference was obtained for both brown and white varieties.

PSOC19 **Impact of nutrition education on vit.A status of pregnant women and lactating mothers.** *Kasturiba* and Rama Naik, College of Rural Home Science, Univ. of Agricultural Sciences, Dharwad.

A study was conducted to determine the impact of nutrition education intervention on Vitamin 'A" and Iron status in pregnant and lactating mothers. The pregnant women and lactating mothers were divided in to two groups (30 each), one group served as control without any intervention and the other group received nutrition education intervention, held in three sessions for a period of three months. Nutrition education was imparted through structured lectures, result and method demonstrations and programmed exhibitions supplying ample information on the theme of combating Vitamin 'A' deficiency through horticultural intervention by maintaining kitchen garden and consuming low cost horticultural foods. The serum retinol and blood haemoglobin were analysed before and after the nutrition education intervention. The study demonstrated that 80 percent of pregnant women and 81 percent of lactating mothers risked the Vitamin 'A' status by recording serum retinol level less than 20 g/ml and about 85 percent of pregnant women and 75 percent of lactating mothers were also anaemic. Nutrition education intervention improved the serum retinol level in both the groups and increased haemoglobin level significantly among pregnant women. Systematic and structured Nutrition education for both pregnant and lactating mothers indicated the positive effect, revealing the necessisity in terms of nutrition, education or constant and compelling counselling with respect to diet and nutrition among these vulnerable groups.

PSOC20 **Identification of critical control points in selected preparations at UAS hostels.** *Sheela* and Anil Kumar, Department of Rural Home Science. University of Agricultural Sciences, Hebbal, Bangalore

A microbiological investigation to identify critical control points was carried out in selected hostels of University of Agricultural Sciences, Bangalore. Six commonly served foods i.e. Rice, Lemon Rice, Chappathi, Chicken Curry, Sambhar and Fruit Salad were selected at random and subjected to microbiological analysis for aerobic mesophilic counts and also for the presence of faecal indicator organism *Escherichia coli* at different stages. The results indicated that, an appreciable number of bacterial counts was present in raw materials like rice, wheat four, dhal, chicken and fruits in dilutions upto 10^4, which was due to unclean production practices, contamination from unhygienic handling by food handlers and unclean equipment etc. Even the containers and equipment used showed a significant amount of microorganisms in 10^2 dilution. In fruit salad where no heat treatment was given and where handling was more, higher incidence of *Escherichia coli* was reported and the sarne was observed on the hands of food handlers which was due to poor personal hygiene. Thus emphasis on food safety education is recommended.

PSOC21 **Prevalence of obesity and diabetes among urban middle class women of Punjab.** *Sharda Sidhu*, Deepika Mohan. Department of Human Genetics Guru Nanak Dev University Amritsar- 5

In the present cross-sectional study, an attempt has been made to generate baseline information about the prevalence of obesity and diabetes among the urban middle class women of Punjab. The data for the present study has been collected from 300 unrelated adult women ranging in age from 30 to 60 years. All the subjects were drawn from various residential colonies of Jalandhar City of Punjab. For the assessment of obesity, the height and weight measurements were taken on each subject. The practical and clinical definition of obesity is based on BMI. The suggested critical limits of BMI by WHO (1998) were utilized for the assessment of obesity. Blood glucose concentration at fasting level of all the subjects was checked with the help of glucometer. It is apparent from this study that the prevalence rate of obesity and diabetes is 29.66 and 10.60%, respectively. While comparing the present data with other population of India, it is evident that the prevalence rate of obesity and diabetes in the present study is in line with other Indian studies which had also shown a high prevalence in high-income groups.

PSOC22 **Energy costs of activities for women in rural India.** *Gokhale MK*, Shobba Rao and Kanade A N., Biometery & Nutrition Group Agharkar Research Institute,Pune.

Energy expenditure forms the basis of energy requirements and is estimated using FAO/WHO/UNU (1985) equations. However this equation is known to overestimate BMR especially for populations from developing countries. We therefore measure the energy costs in duplicate, for 6 min each, for standard and other daily activities for urban (n=42) and rural women (n=23) using oxylog. Standard activities comprised of RMR, sitting,standing and walking while daily activities on rural women included resting(4 activities), cooking (4 activities), cleaning (5 activities), fetching water(3 activities)., farming (5 activities) and other (5 activities). RMR (Kcal/min) for rural women (0.72 ± 0.05) was significantly ($p<0.05$) lower than for urban(0.83 ± 0.07) even after adjustment for body weight and FFM. The energy costs for most of the activities were lower when compared with the values reported for other countries(Lawrence et. al., 1985 and Torun et. al., 1982). Of the 26 common daily activities measured on rural women, only three activities i.e. carrying two water containers on head (4.77 Kcal/min/55 Kg),washing clothes at well (3.97 Kcal/min/ 55 Kg wt), and chopping firewood (3.99 Kcal/min/55 Kg.wt.) could be classified as moderate while other fell into light category. The values of energy costs could be used for estimating daily EE of rural Indian women and will probably be helpful for explaining their lower intakes.

PSOC23 **Weight gain patterns and birth outcome among urban affluent mothers.** *Kanade Asawari.* Rao Shobba, Karandikar Neelima and Kelkar Rohini. Biometry Nutrition Group, Agharkar Research Institute, G.G. Agarkar Road, PUNE 411 004.

We investigated the association of weight gain in early and late gestation with birth outcome among urban affluent mothers (n=211) who delivered full term singleton babies. These women were assessed for anthropometry, dietary intake (24-hr, FFQ) twice during pregnancy (18^{th} and 28^{th} wk.) and neonatal anthropometry within 72 hrs. after delivery. Although, pre-pregnant nutritional status was good, weight gain in early pregnancy (upto 18^{th} wk.) was very low (2.16 ± 2.63 kg) mainly due to high proportion of nausea and vomiting. But weight gain improved substantially by 28^{th} wk. (7.56 ± 3.43 kg). Women who had poor weight gain in first trimester but higher gain in second trimester were therefore compared with those who had poor weight gain throughout gestation. In the former- group, despite substantial weight gain, birth weight (2.98 ± 0.32 kg) was similar to that in later group. However significant ($p=0.007$) increase in skinfold at triceps (5.31±

6.7 mm) was seen in the former group indicating that weight gained in late pregnancy is likely to be due to significant (p=0.000) gain in fat mass but was not reflected in birth weight. On the contrary, women with high weight gain throughout pregnancy delivered babies with higher (p=0. 02) birth weight (3.09 ± 0.30 kg) as compared to those who gained higher weight only in early gestation. They also showed significant increase in mid-arm circumference (1.01± 1.39 cm, p=0.008) and fat free mass (p=0.000). The observations suggest that birth weight is more influenced by maternal weight gain in fat free mass than the gain in fat mass.

PSOC24 **Evaluation of wheat grown at black soil conditions for composition and traditional products.** *Chandramati J. Rokhade* and Dr. Meera Rao, College of Rural Home Science, University of Agricultural Sciences, Dharwad.

The wheat DWR-162 grown in medium- deep black soil and deep black soil conditions was analysed for nutrient composition and quality characteristics using standard methods. Traditional wheat products viz., *'Vermicilli'*, *'Gulagi'*, *'Avarehuvu'* and *'Savatebeeja'* usually used for making *'kheer'*, were prepared and evaluated for acceptability by sensory methods. The wheat grown under deep black soil conditions had significantly higher protein, fat, crude fibre, calcium and iron content compared to medium deep black soil grown cereal. The quality characteristics like wet and dry gluten content and sedimentation value differed significantly with respect to different soil conditions. The dough of the wheat was creamish in colour, non-sticky and elastic, but the percent water absorption of the dough was significantly higher for the deep black soil grown compared to medium black soil grown wheat. Traditional products like *'Vermicilli'*, *Avarehuvu* and *'Savatebeeja'* were highly acceptable for the wheat grown under deep black soil. Hence it was concluded that the wheat grown under deep black soil conditions was rich in nutrient composition and had highest acceptability for traditional products.

PSOC25 **Fortification and sensory evaluation of sorghum cut-chips with soybean at different levels.** **Mrs. Kumudini R. Dhore** and Miss. Geeta B. Mundada, Smt. Radhadevi Goenka College for Women, Akola (M.S.) 444 005

An experiment was planned to develop palatable yet nutritious popular recipe out of the cheapest available source of protein i.e. soybean through the most preferred scrghum product cut chips in rural area of Vidarbha region. Sorghum flour contains 11.25% moisture, 8.50% , protein, 1.62% ash, 72.80% carbohydrates; and 2.95% fats and soybean flour contains 8.20% moisture, 43.2% protein, 4.50% ash, 20.80% carbohydrates and 19.40% fats. The most popular rural sorghum recipe cut chips was prepared by adding soybean flour at 10, 20 and 30% levels. The nutritive evaluation revealed that the protein content of the product was increased whereas the carbohydrate content was decreased with increasing level of soybean flour in the product. However, the energy value of the product did not differ significantly. The mean comparison of scores for organoleptic attributes showed non significant difference between the treatments. However, the cut chips fortified with 30% soybean flour scored the highest for overall acceptability. Therefore, 30% soybean flour can be added for fortification of sorghum cut chips.

PSOC26 **Knowledge Level of Village Women about Neglected Vegetables.** *Manisha Kale**, Kalpana Ghatol**, Rupal Wagh* and Deepa Bhise* P.G.T.D. of Home Science, Amravati University, Amravati (MS) **Vidarbha Mahavidyala Amravati (MS)

The present study was conducted to assess the knowledge level of village women about neglected vegetables prevailing in the village and their medicinal use. Study was conducted in village Chandur of Amravati District. Ten different areas were selected randomly. Later ten village women from each area were

randomly selected taking the total sample size to 1 00. For collecting the data respondent were personally interviewed with the help of specially designed schedule. The collected data were processed and tabulated by using simple statistical tool like mean, standard deviation and percentage. Knowledge level of the respondent was measured by the assessing their awareness about vegetable and various parts of vegetable used for eating and medicine purpose. For the suitable questions were framed, one score was given for awareness about each aspect i.e. vegetable and its parts. By summing the scores total score was worked out which indicate the knowledge level score of the women. Respondents were grouped into three categories namely low, medium and high knowledge level by using the formula mean ±1 standard deviation. Results shows that majority of respondents (68.50%) had medium knowledge level, while 18% respondents had low knowledge level and 13.50% of respondents had high knowledge. Knowledge level could further increase by conducting various nutrition education programmes in the villages as most of the vegetables are very nutritious and have medicinal value also.

PSOC27 **Assessment risk of health through food habit of urban woman.** *Kalpana ghatol**, Manisha kale**, Monika agrawal** and Shilpa bhaise**. * Vidarbha Mahavidyalaya, Amravati (M.S.) ** P.G.T.D. of Home Science Amravati. University, Amravati.

The present study was undertaken to assess risk of health through food habits of urban women in Amravati city. Five middle class areas were selected randomly in Amravati city. 20 women (30-45 years,) were selected randomly from one area of city taking sample size to 100. For collecting the data, the respondent were personally interviewed with the help of, specially design schedule. For each question different choice were given and scores were given to different choice acc. to their importance in health. By summing the scores of all question total score was worked out. Respondents were grouped in to 3 categories namely high risk (scores less than 19) medium of health, risk (score 20-29) and low risk, (score 30-48). Result showed that majority of women (60.38%) had low risk of health. Very few women (8%) had high risk of health. Their knowledge about food habits could further be increased by conducting various nutrition prog. to protect them from the risk of health.

PSOC28 **Nutrient intake and cholesterol level of hypercholesterolemic patients.** *Nandini Sarwate*, Kirti Sharma., Govt. New Girls P. G. College, Indore, M. P.

Recent data on CHD shows that in the world highest percentage of CHD case are found in India. A half-century of freedom has changed the availability of food and eating pattern of Indians. In the present study, 90 hypercholesterolemic patients (range 251:369 mg cholesterol/ 100 ml of blood) show the relationship between nutrient intake and cholesterol level of blood. Karl-Pearson's correlation shows that there was significant ($p<0.01$) positive correlation between calories, protein, fat and carbohydrate with cholesterol level of blood. In those cases whose cholesterol level was above 290 mg/100 ml of blood, their caloric intake was also high. Protein, Fat and carbohydrate intake was also high in these patients, and most of the patients were non-vegetarian. Fat provided 45% of total calories in their diet. In carbohydrate, sugar intake was quite high.

PSOC29 **Training need of rural women about home remedies.** *Kalpana Ghatol**, Manisha Kale**, Sarika Nimalkar**, Asha Mane**. * V.M.V.Amravati, ** P.G.T.D. of Home Science, Amt. University, Amravati

The study was therefore undertaken to identify training need of women regarding home remedies. The study was conducted in village Rajura Of Amravati district total 100 women (30-45 years) were selected as sample from the whole population. The study was conducted by personal interviewing the women with the help of questionnaire. This questionnaire covered different questions on home remedies for ex. accidents,

fire, burns diaorrhea, fever, headache, common cold, allergy, care of aged, ear pain, tooth ache, measles, nutritional deficiency diseases and their control. Result showed that majority of women were in low-income group illiterate and middleage group majority of women (60.82%) were (interested) inthese type of training's. The x^2 (chi) table value for accidents, fire, allergy, ear pain, toothache, common cold, headache, shows significant difference. It is concluded that organization of training programme on above said home remedies is necessary.

PSOC30 **Impact of nutritional education on the knowledge about maternal nutrition among pregnant women in Akola city.** *Anjaii Rajwade**; Dr. A.G.Mane**; Dr. P. O. Ingle***. *Sr. Lecturer, Smt.R.D G, College, Akola, **: Reader, P.G.T.D. Amravati University; Amravati; ***Associate Professor, Extension Education, Dr. P, D. K.V., Akola.

A set of questions related to maternal nutritional knowledge, was subjected to rating with proper continuum by experts. After weighted scoring final list of 40 questions was made. 180 respondents were subjected to assessment based on this question set before & after imparting nutritional education. Based on knowledge quotient (K.Q.), Study group was split in to 03 knowledge levels, low (up to 33), medium (34-66) & high (above 66). The result revealed that ; before imparting nutrition education 84.44% ; 15.56% & 00% respondents were in low; medium & high 'K' level respectively; which changed to 4.44% ; 58.33% & 37.22% in low, medium & high 'K' Level respectively showing improvement. The % change in knowledge was also calculated. This showed that, 51-100%, 101-150%, 151-200% & above 200% change in knowledge was seen in 15.56%, 34.44%, 23.33% & 26.67% respondents respectively. The results were statistically confirmed by chi square test. These results confirm the positive knowledge gain achieved by maternal nutritional education. Nutritionally educated expectant mothers will understand the importance of good nutrition for a successful pregnancy, nutritionally balanced family members & ultimately community nutrition.

PSOC31 **Awareness of subjects regarding iodised salt and status of salt iodisation.** *Ritu Pradhan** & Maya Choudhry**, Foods & Nutrition Dept, College of Home Science, MPUAT,Udaipur. 313001.

Iodine deficiency disorders (IDD) is a major public health problem all over the globe including India. Awareness of subjects regarding the role of iodised salt in overcoming the IDD contributes to the consumption of iodised salt, a vehicle used for fulfilling the requirement of iodine. Hence the study was conducted in the urban areas of Udaipur with the objective to assess the awareness of households regarding iodised salt by administering a structured questionnaire on 282 households. Also, the status of iodised salt at the beneficiary level was assessed. Results of the study revealed that more than 60 per cent of the households knew about IDD as a public health problem. More than 85 per cent of the households reported the use of iodised salt for cooking food. However, only 75 per cent of subjects reported their awareness about importance of iodised salt. Only 60 percent of house holds had knowledge regarding the logo of iodised salt. Further, the assessment of status of salt iodisation at the beneficiary level as estimated by standardized iodometric titration method, revealed that more than 85 percent of salt samples had iodine content of 15ppm or more. Hence, it can be concluded that awareness of households regarding iodised salt can contribute in overcoming the deficiency of iodine by increasing consumption of iodised salt.

PSOC32 **Assessment of iodine deficiency disorders in urban areas of Uaipur, district Rajasthan.** *Ritu Pradhan* and Maya Choudhry, Food and Nutrition Departent, College of Home Science, MPUAT, Udaipur - 313001

Iodine deficiency disorders is a public health problem in India and no state is considered free from the disease. Keeping in view of the large magnitude of the problem a policy of universal salt iodisation was

launched in 1984. Considering the lack of available data in the urban areas of Udaipur district, present study to assess the prevalence of iodine deficiency disorders was carried out. The study was conducted on 6-12 years school going children of urban areas of Udaipur. The present study revealed a goitre prevalence of 8.4 percent. Biochemically nearly 8 percent children were suffering from deficiency of iodine but the median iodine levels of the study population was found to be 20 mcg /dl. Iodometric titration of salt samples collected from the beneficiaries revealed that none of the salt sample were having nil iodine content and more than 85 percent of the salt samples had within or more than the stipulated levels of iodine i.e:15 ppm of iodine. Hence it can be concluded that the population is in the transition phase from iodine deficiency to iodine sufficiency due to successful implementation of salt iodisation program.

PSOC33 **Sensory evaluation of milk quality sold under brand name in Amravati city.** *Aruna Deshmukh*, Sandhya Joshi and Meghana Deshmukh, Matoshree Vimalabai Deshmukh Mahavidyalaya, Shivaji Nagar, Amravati 444603, Maharashtra.

Milk is the most nourishing of all foods and a favourite drink of people across the world. Time lag between milking the animals and reaching this milk to consumer is quite short. On the contrary, branded milk sold in the local shops may take time to reach the consumer and there are chances of spoilage. Studies have indicated that, though, preservatives in milk are prohibited by law, certain alkalies injurious to health are used to neutralise the acids formed during storage in shops. With this background, a project mentioned in the title was undertaken as quality is the ultimate criterion of the desirability of any food product. Five trained panel members were selected and sensory score card was prepared by using standard techniques. Three common milk recipes (Plain milk, curds and coffee) prepared from freshly procured samples and branded samples were evaluated 4 hourly for 16 hours. Scores obtained were compared using 't' test. The results indicated obvious differences in palatability parameters between the samples with branded milk receiving less sores in appearance, flavour and overall acceptability. The scores for flavour declined consistently in branded samples during time possibly due to microbial changes caused by staleness. It may be concluded that milk is spoiled thereby producing acids. However, these acids are neutralised by intentional addition of alkali. Hence, studies to establish simpler methods for ascertaining the access to safe milk supply in mofussits are required.

PSOC34 **Dietary fibre intake and related diseases in the elderly with poor masticatory performances.** *D. Jasmine jenifer Arulmani* And K.S. Sarojini. Department of Food Service Management & Dietetics, Avinashilingam University - Coimbatore.

Fibre intake plays a major role in the dietary status and health of the elderly. The present study was undertaken to their fibre intake and the prevalence of diet related diseases in elderly with poor masticatory performance. The sample included 200 males and 200 female elderly and a survey on masticatory efficiency showed that 78% elderly males and 29.5% females had poor mastication whereas 22% elderly males and 70.5% females had good mastication. Study on dental assessment revealed a greater percentage of elderly with poor mastication having several dental problems (Dental caries, gum problems, missing teeth) compared to those with good mastication. Study on medical history also revealed a higher percentage of diet related diseases (Obesity, diabetes, CVD) hypertension and gastrointesitnal disease among elderly with poor masticatory efficiency. On the whole comparison of elderly with good and poor mastication using T-test, multiple analysis of variance and correlation analysis, it was concluded that elderly with poor masticatory efficiency definitely have a higher risk in diet, dental and medical status and also have higher prevalence of diet related

diseases compared to the elderly with good masticatory efficiency and the possible cause is due to their low fibre intake.

PSOC35 **Role of FIG (*Ficus roxburghii)* in combating micronutrient deficiency.** *Rita Singh*, Raghuvanshi, Ratna Singh, ShikhaTripathi; Department of Foods & Nutrition, College of Home Science, G.B.Pant University of Agriculture & Technology, Pantnagar; Uttaranchal.

To provide food security there is need to explore every possible source of nutrients. There is enormous fruit material which has not been explored for consumption. Recognizing the need for the identification of such fruits and vegetables which are nutritious and may help in achieving nutritional security, the present study was undertaken. The objective of the study was to estimate- the proximate composition, mineral content, vitamin content, in vitro bioavailability of iron and calcium, protein digestibility and two antinutrients i.e. oxalic acid and phytic acid in green and ripe *Ficus roxburghii.* Fruits of *Ficus roxburghii* were collected from the forest. The fruit sample was analysed in both the green and ripe stage. Estimation of dietary principle revealed that fig is a rich source of nutrients. Results showed mineral content 1.15 mg & 1.92 mg, calcium content 123 mg & 167 mg, iron content 2.49 mg & 4.34 mg, iodine content 1.47 microgram & 5.16 microgram, beta-carotene 169 microgram & 224 microgram, ascorbic acid 4.24 mg & 3.26 mg, oxalic acid 218 mg & 138 mg, phytic acid 4.8 mg & 9.6 mg in green and ripe fig respectively. Fresh fig is a delicious fruit with high nutritive value. Figs owe their food value chiefly to their mineral and vitamin content. The total mineral content is two to four times that of most other fresh fruits. Findings of the study indicate that fig *[Ficus roxbughii]* is a good source of micronutrients.

PSOC36 **Nutritional status of indian sports women.** *Dr. N.B. Shukla*, Physical Education B.H.U., Varanasai.

Nutrition play an important role in the training of out standing sports women Good Nutrition is essential in achieving a level of physical work capacity for sports women. It is now proved that the right diet combined with proper training and coaching can significantly improve sports performance. For sports women a balance diet includes food from four basic groups. The milk group, the meat group, the fruit and the bread. This did improve the performance of sports women.

PSOC37 **Assessment of associated factors of malnutrition among pre-school children of higher income group in relatin to mother's health status and food habits.** *Ms. Kavita Rana* and Munira M. Hussain, college of Govt. New Girls PG College, Kila Maidan, Indore.

150 children of 1-3 yrs. aged, belonging to higher income group, residence of Indore city was the sample of this study selected through random purposive sampling method. According to body weight status the subjects were classified as under weight, normal weight and over weight. Mother's health status and food habits were assessed to find out their association with child's weight status. The results so obtained revealed that 34/150 mothers were malnourished and 30 of their children were underweight. 116/150 mother's were normal in weight, 70 of their children were underweight, 38 were normal and 8 were over weight. Nutritional status of mothers during pregnancy and weight gain by them has been found significant association. 100, 40 and 10 children were found underweight, normal weight and over weight respectively of mothers who did not gaind normal weight in pregnancy. 150 Mothers who gained normal weight in pregnancy had 40 normal, 100 under weight and 10 over weight children respectively. 43 Mothers's knowledge of Nutrition is found good; they have 40 normal, 100 under weight and 10 over weight children. Education of mother, food belief and immunization have not found significantly associated with child's body weight status.

PSOC38 **Effect of domestic processing on phenolic content of foods.** *Rita Saxena,* M. Raghunath, C.V.K. Reddy and Kamala Krishnaswamy, National Institute of Nutrition, Hyderabad.

Considerable evidence indicates that phenolic substances are important antioxidants in plant foods. However, there is little information on the effect of domestic processing on their phenolic content and/or antioxidant activity (AOA). This study was done in cereals, pulses and vegetables to obtain this information and the data is provided on the phenolic content. There was a significant increase (22-205%) in the phenolic content of cereals on different kinds of processing, compared to raw foods. In whole pulses as well as dehusked dhals processing increase the phenolic content. The quantum of increase was however more In whole pulses than dhals. Although green leafy vegetables (GLV) did not differ much from other vegetables in their phenolic content, processing significantly decreased the phenolic content in amaranth (a, GLV) whereas it increased in brinjal. Among all the foods tested, raw amaranth leaves (394.6 mg gallic acid equivalent /100 g raw food) and processed brinjal (441 mg gallic acid equivalent) had the highest phenolic content. It was interesting that foods which are also consumed in raw form (eg. spinach, tomato and onion) showed no significant changes in their phenolic content on processing. The antioxidant activity of these foods (raw and processed) is currently being determined using an in vitro system..

PSOC39 **A study on impact of anxiety on the nutritional status of - adolescent girls.** *Anisa Musarsth Durrani,* Women's College, Aligarh Muslim University, Aligarh.

A study was conducted to find out the relationship between manifest anxiety and the nutritional status. The samples consist of 680 high school student from six different schools. Modified Taylor's manifest anxiety scale was used to assess anxiety level and the anthropometric measurements were used to assess nutritional status. Background family information, age, income, education level etc. were obtained. Socioeconomic status was calculated by using Kuppuswamy scale. Parametric and nonparametric statistical techniques were used to obtain percentages, mean, median and standard deviation and their corresponding significance. The study revealed that mean height was much lower than that of the 50th percentile of NCHS among all the ages. The mean weight was also considerably lower The percentage of girls with a normal anxiety level increased as age advanced and [illegible] percentage of girls at age 13+ exhibited a high anxiety level and vice versa. The nutritional status [illegible] to influence the anxiety level in the adolescent girls.The socioeconomic status did have an effect on anxiety level. The scores for psychological attitudes, nervousness and psychological problems were highest. There was a decline in all the aspects as the economic status increased.

PSOC40 **Women's role in improving nutritional status of the community.** *Dr. Sanjay S. Agarwal,* Dr. (Mrs.) Neeti S. Agarwal, Dr. P. B. Verma, Dr. Jairaj S. Hanspai, Department Of Preventive and Social Medicine, Medical College, Bhavnagar, Gujarat State

Women's participation has become increasingly recognized as an important element in improving health and nutritional status, particularly among poor and under-served populations in developing countries. The, present study was undertaken to find out influence of women in nutritional matters of family. The study was done in three areas rural, urban and urban slum of jamnagar district of Gujarat. Study points out where women have some awareness regarding nutritional contents of food consumed and are literate, this has inverse relationship with prevalence of malnutrition in that particular area. Study also gives chance to analyze factors which are detrimental to health and women's do have some role in controlling them. This study also

sensitizes women regarding nutritional contents of common food so as to empower them against locally prevalent nutritional deficiency diseases.

PSOC41 **Comparative knowledge, attitude and practive (kap) regarding child nutrition among urban, rural and tribal anganwadi workers (AWW),** *Anita Joshi,*CDPO, ICDS Urban No. 1, Bal Niketan Sangh,Indore, M.P.

The 60 AWWS, 20 each of urban, rural and tribal ICDS area were selected by random purposive sampling method. The AWWs who had received complete job training were selected only. Their knowledge, attitude and practice regarding basic issues of child nutrition like early infant feeding, breast feeding and top feeding, were studied through questionnaire method. Obtained result revealed that in knowledge and practice urban groups are ranked first and scored 90% and 99% marks while tribal group stand second 86% and 78% marks respectively . Rural groups were the least scorer and achieved 75% and 68% marks respectively. In attitude rural and tribal groups achieved 100% marks while urban group scored 95%. Total mean score obtained by the three comparative groups regarding KAP is 94.6% (4.10), 81% (13.7) and 84.6% (12.3) of rural, urban and tribal area. Urban group is found the highest awared group and rural is the least. Regarding different aspects of child nutrition, scores obtained by different groups individually revealed that in early infant feeding urban group scored 100%,100% and 80%. Rural group with 65%, 85% and 100% while tribal group scored 100%, 60% and 100% marks in knowledge, attitude and practice respectively. Regarding method of top milk feeding in knowledge 100%, 70% and 90%, in attitude 90%, 100% and 100% and in practice 95%, 80% and 80% marks obtained by the urban, rural and tribal groups respectively. In KAP of breast feeding, urban group scored 60%, 100% and l00% marks, rural group scored 50%, 100% and 85% marks, while tribal group obtained 50% 1 00% and 65% marks respectively.

PSOC42 **Protein : energy interaction with protein quality & its impact on human nutrition.** *H.O.Gupta,* Cummings Laboratory Indian Agricultural Research Institute, New Delhi -12

Protein and energy, which are deficient in developing world, paricularly in India, are interrelated in human nutrition. in the common diet of most of rural population of the country major dietary protein comes from cereals which provided more then 70 percent of energy. Availability (per caput/day) of calories as weil as protein in india is still lower than that of recommended allowances. This gap is more, particularly among vegetarian population of the country. Food grains like cereals and pulses themselves provide major share energy and protein in the common diet in the most of the population. In many regions diets commonly have mixture of cereals grains while in other regions a single cereals grains are consumed as the staple food . Mixture of legumes (pulses) and cereals are better for balancing amino acid composition than either of the two components. The international chemical manipulation particularly limiting amino acid (s) of food grain would, therefore seem to be a boon to relieving the pressure for inexpensive and more plentiful food. Therefore in the present manuscript informations with respect to energy requirement and its impact on limiting amino acid (s) in different food grains have been reviewed

PSOC43 **Study on serum calcium level and calcium intake with reference to menopause in females of jabalpur city.** *Smita Pathak and* Brijlata Dubey. Deptt. of Foods & Nutrution, Govt. M.H. College of Home Science & Science for Women, Jabalpur (M.P.)

A study was carried out on three groups of female subjects (100 each) belonging to low income group randomly selected from Government Hospitals of Jabalpur City to assess the relationship of menopausal age,

calcium intake and serum calcium level. It was observed that the second group of premenopausal females (aged 35 to 45 years) and third group of postmenopausal females (aged 45-55 years) showed much reduction in mean serum calcium level 8.54 and 8.12 mg % respectively compared to first group (9.83 mg%) of young females (aged 25-35 years). Data on daily dietary intake of calcium also showed higher values (573.52 mg) in first group when compared to second (406.23 mg) and third group (387.23 rng). In third group of postmnopausal females 12% showed osteoporotic changes in bones.

PSOC44 **Training needs and effectiveness of training imparted to the farm women of bhopal district regarding "Preparation of nutritious soy based food products at domestic level.** *Neerja Lalan,* R.T.Patil, L.K.Sinha and Parveen K.Baig CIAE

The study is aimed to findout the training needs of farm women of Bhopal district. The 10 villages from 2 blocks of Bhopal district were selected. The findings revealed that majority of the farmers were taking very low protein in their diet. Therefore, the training regarding "Preparation of nutritious soy based food products at domestic level" was imparted and the effectiveness of training was studied. It was found that before training all respondents were having medium level of knowledge. Before starting the training, dietary survey was conducted and it was found that respondents know nothing, about the soybean but after training the respondents learn about soy products and 7out of 10 adopted it as domestic occupation. The results show that most of the trainees were satisfied with the curriculum of the training, while some trainees suggested to introduce local recipes of their areas.

PSOC45 **"Comparative study of feeding practices of children from birth to 3 years in low socio economic urban & rural group.** *Rasheeda Kanchwala*,* Munira M. Husain.** * Govt. P.G. College, Mhow., ** Govt. New Girls P.G. College, Indore.

An investigation on the comparative pattern of breast feeding and weaning in rural and urban low socio economic families of Indore district was carried out 50-50 samples from both the groups were questioned about time of introduction of breast milk, duration of breast feeding, time of introduction of supplementary top milk, formulae of top milk, weaning practice and formulae or weaning food through a specially formulated schedule. The datas denoted improper orientation of breast feeding both in rural and urban area, lengthy breast feeding period in both the areas, improper supplementary top milk feeding in both the areas, high dilution of top milk in both the areas, it however showed that although the time of weaning was late in both the groups yet it was not late by 1 year in urban group while in rural group it was not done still after 1 year (in 84% cases), in both rural and urban areas weaning was mainly due to demand of child and the content of weaning foods was mainly of our community. The above results demand for keen and cautious planning for education of these deprived lower classes of our community.

PSOC46 **Body composition of women prisoners.** *Geetha, K.* and Mushtari Begum J., Division of Rural Home Science, University of Agricultural Sciences, Hebbal, Bangalore - 560024.

The study population consisted of 40 adult female prisoners aged 20-59 years, respectively, with minimum of six months of stay in prison. Anthropometric parameters such as height (cm), weight (kg) mid-arm circumference (cm), fat fold thickness (mm), waist circumference (cm) and hip circumference (cm) were measure and indices were derived. Results of the study indicated that 75 per cent of the females to be normal as judged by BMI and weight for height per cent. According to Broka's index and Lean body mass index (LBMI), 65 and 72.5 per cent of them were normal on the other hand waist-hip ratio indicated 47.5 per cent of the subjects to be normal, while remaining 52.5 per cent to be obese. On the whole anthropometric indices indicated that majority of the female prisoners were normal as judged by BMI, weight for height per cent, Broka's index and LBMI. However, mid arm circumference and arm muscle circumference indicated lower protein status.

REPORT FOR THE YEAR

2000-2001

MINUTES OF THE DELIBERATIONS OF THE EXECUTIVE COMMITTEE MEETING HELD ON 1st DECEMBER 2000 AT 3.00 P.M. AT THE NATIONAL INSTITUTE OF NUTRITION, HYDERABAD

The Executive Committee meeting of the Nutrition Society of India was held on 1st December 2000 at National Institute of Nutrition, Hyderabad. The members who attend the meeting were Dr. C. Gopalan, Dr. B.S. Narasinga Rao, Dr. Rajammal P. Devadas, Dr. Vinodini Reddy, Dr. Kamala Krishnaswamy, Dr. Sushma Sharma, Dr. V. Ramesh Bhat, Dr. H.P.S. Sachdev, Dr. B. Sivakumar, Dr. Umesh Kapil, Dr. G.N.V. Brahman.

Dr. S. Vardarajan, Past President of the Society attend the meeting as a special invitee. Conveners of various chapters of the Society also attend the meeting.

1. Dr. B.S. Narasinga Rao, President of the Society welcomed the members and sought active cooperation of the members of the functioning of the society.
2. The minutes of the last meeting held on 25.11.1999, which were circulated earlier, were approved by the members.
3. The next point of the agenda was topics of the symposia for the forthcoming 34th Annual meetings of the society which are tentatively proposed to be held at Calcutta* during November 2001.
4. The valid nominations of the Office-Bearers and the Executive Committee received by the Society were presented to the Executive Committee. Only one nomination each was received for the posts of Office-Bearers and the Executive Committee Members. They were approved unanimously by the Executive Committee for the term 2001-2003 as follows:

President	:	Dr. B.S. Narasinga Rao
Vice- Presidents	:	Dr. Sushma Sharma, New Delhi
		Dr. Ramesh V. Bhat, NIN, Hyderabad
Secretary	:	Dr. H.P.S. Sachdev, New Delhi
Joint Secretary	:	Dr. B. Sivakumar, NIN, Hyderabad
Treasurer	:	Dr. G.N.V. Brahmam, NIN, Hyderabad

EC members (13 posts)

1. Dr. N. Kochupillai, New Delhi
2. Dr. Meenakshi Mehta, Mumbai
3. Dr. Sheila Vir, Lucknow
4. Dr. Kanta K.Sharma, New Delhi
5. Dr. Vijayalakshmi Purushowthaman, Coimbatore
6. Dr. Vijaya Khader, Hyderabad
7. Prof. Sunder Gujral, Haryana
8. Dr. Sheela Siddharam, Gulbarga
9. Dr.Madhu Mishra, Bhopal MP
10. Dr. B.K. Tiwari, New Delhi
11. Dr. S. Ganansundaram, Chennai
12. Dr. Ulliyar Mani, Baroda
13. Mr. S. Kalyanasundaram, NIN, Hyderabad.

* Subsequently due to some unavoidable reasons Bhopal is being considered as the venue for the meetings in 2001

As per convention, Dr. C. Gopalan, Founder-President, Dr. B.N. Tandon,, Immediate-Past President, Dr. Kamala Krishnaswamy, Director NIN and Dr. Vinodini Reddy, Vice-President, IUNS, are the Officer-Bearers of the Society.

5. There was discussion about forthcoming Asian Congress of Nutrition 2003 regarding the venue and the dates. It was suggested that Delhi may be the suitable venue and a Satellite Symposium could be held in Hyderabad. The regular features of Annual Conference meeting like the Gopalan Oration and Srikantia Memorial Lectures of that year should be incorporated into 4-5 day deliberations of the programme. There was a suggestion to seek the comments of the convenor of chapters regarding the prespective topics for the symposia.

6. Dr. Gopalan addressed the Committee of the deliberations of the Organizing Committee headed by him on the preparations being undertaken for the Ninth Asian Congress of Nutrition to be held at New Delhi in February 2003.

7. The Committee had discussions on the proposal of Nutrition Society. Media Centre and many members including Dr. Gopalan suggested that NSI should not be involved in such activity.

8. The Committee approved the proposal of institution of a new award from the year 2001 in the name of Mr. K. Ramanathan. This will be given to a Free Communication Paper adjudged to be the best paper presented during the Annual Meetings. A cash award of Rs. 1000/- will be presented along with other awards of the Society. The general modalities of operation of the award have been presented by the Joint Secretary and were approved by the Committee.

9. Similarly, draft guidelines prepared by Dr. Sivakumar, Joint Secretary in consultation with the President Dr. BS. Narasinga Rao, Dr. C. Gopalan and Dr. Kamala Krishnaswamy for the operation of Dr. Srikantia Memorial Lecture, were presented to the Committee by Dr. Sivakumar and were approved.

10. Dr. B. Sivakumar, Joint Secretary presented to the Executive Committee, the list of NSI chapters which have not sent any reports of activities during the last 3 years. The Executive Committee suggested that he should write to the Conveners requesting them to reactivate the centres activity.

11. Creation of website for Trivendrum Chapter has not been approved by the Committee, since often the creation of website for NSI, their activities can be highlighted within NSI activity.

At the end the EC expressed its thanks to all the agencies which provided grants for holding the annual meetings. The meeting ended with vote of thanks of the Chair.

MINUTES OF THE PROCEEDINGS OF THE THIRTY THIRD ANNUAL GENERAL BODY MEETING OF THE NUTRITION SOCIETY OF INDIA HELD ON 2ND DECEMBER 2000 AT NATIONAL INSTITUTE OF NUTRITION, HYDERABAD

1. The Thirty Third Annual General Body Meeting of the Nutrition Society of India was held on Saturday, The 2nd December 2000 at the National Institute of Nutrition, Hyderabad. Dr. B.S. Narasinga Rao, President of the Society chaired the meeting. Over 100 members attended the meeting. Dr. Ramesh V. Bhat, Vice President of the Society welcomed the members of the society.

2. Dr. H.P.S. Sachdev, Secretary of the Society presented the minutes of the 32nd Annual General Body Meeting and the Secretary's Report for the year ending 31st March 2000 and both of them were approved by the General Body.

3. Dr. B. Sivakumar, Joint Secretary of the Society presented the action taken report on some of the issues raised in the previous meeting, which were approved by the General Body.

4. The Treasurer's Report for the year ending 31st March 2000 was presented by Dr. G.V. Brahmam, Treasurer of the Society and it was ratified by the members present.

5. The valid nominations for election of the new Office-Bearers and the Executive Committee for the years 2001-2003 were examined by the Executive Committee. Only one nomination each was received for the posts for Officer-Bearers and the Executive Committee Members. They were accepted unamiously by the members and therefore they were declared elected. Dr. Ramesh V. Bhat, Vice-President announced the following as the New Office-Bearers and the Executive Committee :

President	:	Dr. B.S. Narasinga Rao
Vice- Presidents	:	Dr. Sushma Sharma, New Delhi
		Dr. Ramesh V. Bhat, NIN, Hyderabad
Secretary	:	Dr. H.P.S. Sachdev, New Delhi
Joint Secretary	:	Dr. B. Sivakumar, NIN, Hyderabad
Treasurer	:	Dr. G.N.V. Brahmam, NIN, Hyderabad

EC members (13 posts)

1. Dr. N. Kochupillai, New Delhi
2. Dr. Meenakshi Mehta, Mumbai
3. Dr. Sheila Vir, Lucknow
4. Dr. Kanta K.Sharma, New Delhi
5. Dr. Vijayalakshmi Purushowthaman, Coimbatore
6. Dr. Vijaya Khader, Hyderabad
7. Prof. Sunder Gujral, Haryana
8. Dr. Sheela Siddharam, Gulbarga
9. Dr.Madhu Mishra, Bhopal MP
10. Dr. B.K. Tiwari, New Delhi
11. Dr. S. Ganansundaram, Chennai
12. Dr. Ulliyar Mani, Baroda
13. Mr. S. Kalyanasundaram, NIN, Hyderabad.

As per convention, Dr. C. Gopalan, Founder-President, Dr. B.N. Tandon,, Immediate-Past President, Dr.

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Kamala Krishnaswamy, Director NIN and Dr. Vinodini Reddy, Vice-President, IUNS, are the Officer-Bearers of the Society.

6. Dr. Ramesh V. Bhat, Vice President of the Society announced that the 34th Annual Meetings of the Society will be held at Calcutta* or some other place like Surat* and requested that offers from chapter convenor be communicated immediately to NSI as to the venue for the 36th Annual Meetings of the Society.

7. He also announced about the institution of a new cash award of Rs. 1000/- from the year 2001 in the name of Mr. K. Ramanathan. This will be given for a Free Communication Paper presented during the Annual Meetings adjudged to be the best paper. This award will be present along with other awards of the Society.

8. Dr. B.S. Narasinga Rao appraised the members about NSI being invited to host the 9th Asian Congress of Nutrition in 2003, under the Presidentship of Dr. C. Gopalan. He informed that there have been discussions about the venue being New Delhi, during February 2003 and the possibility of holding a Satellite Symposium at Hyderabad. He also spoke about the new areas that need strengthening and appraised the preparations being undertaken for the Ninth Asian Congress of Nutrition to be held at New Delhi in 2003.

9. Dr. B. Sivakumar, Joint Secretary, acknowledged all the funding agencies who have supported the activities of NSI and proposed vote of thanks to the cooperation received from the senior scientists and all the members of the Society. The Joint Secretary also thanked the Director of NIN and the various Committees, which have made excellent arrangements for the Annual.

Subsequently due to some unavoidable reasons Bhopal is being considered as the venue for the meetings in 2001.

SECRETARY'S REPORT FOR THE PERIOD

APRIL 2000 TO MARCH 2001

It is heartening to note that the general scientific world has at least recognised the importance of nutrition science. Very deservedly, nutrition has been selected as a dominant theme at the forthcoming Indian Science Congress to be held in New Delhi. And, it is more interesting to note that this honour and recognition bestowed on nutrition comes right at the very start of the 21st Century. By selecting nutrition as prime focus area at the dawn of the new millennium, the scientific fraternity perhaps wishes to NURTURE Indian Science in the most appropriate way.

You are all aware that the Nutrition Society of India has completed 34 years and this is the second annual meeting during the New Millennium. It is now my privilege in presenting the report of the activities of the Nutrition Society of India for the period April 2000 to March 2001.

As on date, there are a total of 2090 members on roll, 1570 being Life Members, 211 ordinary members and 309 student members.

XXXIII ANNUAL MEETING OF THE SOCIETY

The XXXIII Annual Conference of the Society was held on 1-2 December 2000 at the National Institute of Nutrition, Hyderabad. About 500 delegates and invitees attended the meeting. Dr. Kamala Krishnaswamy, Director of the Institute welcomed the delegates and highlighted the importance of various scientific programmes organised on the occasion.

In his address, the Founder President , Dr. C. Gopalan, reiterated the nutritional challenges that lay ahead confronting the nation. He warned about the impending double danger of malnutrition and overnutrition. He has also announced that the forthcoming Ninth Asian Congress of Nutrition - 2003 will be held in New Delhi during February 2003 and all chapters should participate actively.

In his Presidential Address, Dr. B. S. Narasinga Rao spoke about the new areas that need strengthening and appraised the preparations being undertaken for the Ninth Asian Congress of Nutrition to be held at New Delhi in 2003.

Dr. S. Varadarajan spoke about the technology gap and dangers of globalization. He urged that more efforts are to be made to exploit our biodiversity and take advantage of our traditional foods and practices.

Dr. Rajammal Devadas acknowledged the role of Nutrition Society of India in providing a platform and partnership for home scientists in the country. She has thanked Dr. Gopalan for giving unstinted support to the cause of home science.

The following two symposia were organized:

SYMPOSIUM ON "CURRENT STATUS AND FUTURE PROSPECTS OF GENETICALLY MODIFIED (GM) FOODS IN INDIA" (December 1, 2000)

Dr. S. Varadarajan and Dr. Mahtab S. Bamji chaired the symposium. Dr. Ramesh V. Bhat was the Rapporteur. The following presented the papers:

Dr. R.P. Sharma	Biosafety of GM foods
Dr.Y.S. Sodhi	Genetic modification for enhancing nutritional qualities of oil and meal in Indian mustard.

Dr. Ajay Parida	Issues and perspectives of transgenic crops for food and nutrition security
Dr. Ramesh V. Bhat	GM Foods: National and International legal requirements

The Symposium highlighted the scope and safety of GM foods in meeting the food and nutritional needs of the country and there was lot of discussion.

SYMPOSIUM ON "IMPLEMENTATION OF NATIONAL PROGRAMMES - A WAY AHEAD" (December 2, 2000)

Dr. Vinodini Reddy and Dr. H.P.S. Sachdev chaired the symposium. Dr. Shahnaz Vazir was the Rapporteur. The following presented the papers:

Dr. K. Vijayaraghavan	National Nutrition Programmes - Current Status
Dr. Vijayalakshmi Purushowthaman	Strengthening nutrition education component in National programmes
Dr. N.Vijayakrishnan Nair	Integration of health and nutrition and role of RCH in control of mal-nutrition
Dr. Siddartha Agarwal	Role of NGOs in National nutrition programmes

The Symposium focused on the status of current nutritional programmes and emphasised the measures necessary to be taken to make them effective and achieving the goals.

Twenty fourth Gopalan Oration

The Twenty fourth Gopalan Oration entitled 'Strategies to meet the global food and nutrient needs in the new millennium" delivered by Dr. Gurdev S. Khush, Principal Plant Breeder and Head of the Division of Biochemistry at International Rice Research Institute (IRRI), Philippines. In his oration, Dr. Khush struck a positive note with the progress achieved in conventional breeding and introduced the exciting prospects of transgenic crops to meet the nutritional demands of the new century.

Twelfth Srikantia Memorial Lecture

Dr. S. Rajagopalan, Distinguished Fellow in MS Swaminathan Research Foundation, Chennai, delivered the Twelfth Srikantia Memorial Lecture on 'Perspective planning for human development'. In his oration, he emphasized the importance of human development as a part of improvement in human nutrition and health and progress of the country and elaborated on the indices used in the assessment of human development.

Awards for Research Papers

1. **Oral Presentations :** A total of 17 papers (Four for Senior Award in Community Nutrition, three for Junior Award in Community Nutrition and Ten for Junior Award in Experimental Nutrition), were presented in the Awards Session. The following were selected for awards:

Senior Award - Community Nutrition: The presentation by Ms. Radhai Sri from PSG College of Arts and Science, Dept. of Food Science and Nutrition, Avinashilingam University, Coimbatore, Tamil Nadu, was selected for Senior Award in Community Nutrition for her paper entitled "Impact of iron supplementation on anaemic status and physical work performance of farm women".

Junior Award - Community Nutrition : The presentation by Ms. Narayanasamy Sangeetha, Avinashilingam University, Coimbatore, Tamil Nadu, was selected for the Junior Award in Community Nutrition for her paper entitled "Impact of vitamin A intervention on vitamin A nutriture of expectant women and their newborns".

Junior Award - Experimental Nutrition : The Junior Award in Experimental Nutrition was awarded to Ms. R. Balasasirekha, Dept. of Food Science and Nutrition, Avinashilingam University, Coimbatore, Tamil Nadu for her paper entitled "Beta- carotene retention in selected green leafy vegetables subjected to dehydration".

Special prize: Ms. Ragineni Vasavi from Dept. of Home Science, Sri Satya Sai Institute of Higher Learning, Anantapur, Andhra Pradesh, was awarded a Special Prize for her paper entitled "Nutrient composition, hypoglycemic and hypotensive effect of mulberry (Morus indica L var Ananta) leaves".

2. Poster Session : About 76 papers were presented in poster sessions. Two prizes - one - Shri Haveliram Pasricha Award and the other NSI Prize were awarded to the following :

Shree Haveliram Pasricha Prize : Ms. Sandhya M. Joshi and Sangita Jawanjal, Department of Home Economics, M.V. Deshmukh Mahavidyalaya, Amravati (Maharashtra), for their paper entitled "Nutritional status of mentally retarded children".

NSI Prize : Dr. Sarat Gopalan, Ms. Shailee Saran, Promila Gahlot of Nutrition Foundation of India, New Delhi for their paper entitled " Efficacy of probiotics in control of diarrhoea and undernutrition in poor children in urban slums"

Asian Congress of Nutrition

Apart from regular activities like symposia, orations and awards during the annual meetings, a preliminary meeting of a Committee of Scientists was convened by Dr. C. Gopalan on the afternoon of November 30, 2000, and it had its deliberations on the theme, structure and scientific contents of the organization of the Asian Congress of Nutrition.

NEW OFFICE BEARERS

The following Office-Bearers/Executive Committee Members were elected for the term 2001-2003:

OFFICE BEARERS

President	Dr. B. S. Narasinga Rao Former-Director, NIN, Hyderabad
Vice Presidents	Dr. Sushma Sharma Lady Irwin College, New Delhi
	Dr. Ramesh V. Bhat NIN, Hyderabad
Secretary	Dr. H.P.S. Sachdev Maulana Azad Medical College New Delhi
Joint Secretary	Dr. B.Sivakumar NIN, Hyderabad
Treasurer	Dr. G.N.V. Brahmam NIN, Hyderabad

EXECUTIVE COMMITTEE MEMBERS

14. Dr. N. Kochipillai, AIIMS, New Delhi
15. Dr. Meenakshi Mehta, Mumbai
16. Dr. Sheila vir, UNICEF, Lucknow
17. Dr. Kanta K. Sharma, Punjab Agricultural University, Ludhiana
18. Dr. Vijayalakshmi Purushowthaman, Avinashilingam Institute for Home Science, Coimbatore
19. Dr. Vijaya Khader, Acharya NG Ranga Agricultural University, Hyderabad
20. Prof. Sunder Gujral, Panipat
21. Dr. Sheela Siddharam, Gulbarga
22. Dr. Madhu Mishra, Bhopal
23. Dr. B.K. Tiwari, New Delhi
24. Dr. S. Gnanasundaram, Chennai
25. Dr. Ulliyar Mani, MS Univ. of Baroda, Baroda
26. Dr. S. Kalyanasundaram, NIN, Hyderabad

ANNOUNCEMENTS

The Society is pleased to announce the institution of a new award from the year 2001 in the name of Mr. K. Ramanathan. This will be given to a Free Communication Paper presented during the Annual Meetings adjudged to be the best paper. A cash award of Rs. 1 000/- will be presented along with other awards of the Society. It is heartening to note that majority of the local Chapters of the Society had undertaken extensive scientific and extension programmes during the year, which are listed below:

BANGALORE CHAPTER

During the period, the Bangalore Chapter organised a Workshop on "Physiological basis of stress and stress management" and four special lectures. A poster & poem competition on the theme "Malnutrition - an obstacle to national development" among college students was conducted in connection with the National Nutrition Week celebrations.

CALCUTTA CHAPTER

The Calcutta Chapter has organised two special lectures during the period. National Nutrition week was celebrated in collaboration with CINI-Child In Need Institute and Dr. Subhas Mukherjee Memorial Reproductive Biology Research Centre. A discussion on "Significance of National Nutrition Week" was also organised by Dr. R.P. Bhattacharjee, former Nutrition Officer of Government of West Bengal.

CHANDIGARH CHAPTER

During the period, the Chandigarh Chapter has arranged a special lecture on "Healthy diet and prevention of anemia" and it was also published. Popular and feeding Week, National Nutrition Week, World Food Day and National Science Day celebrations.

COIMBATORE CHAPTER

During this period, the Coimbatore chapter has organized a series of activities which include: Workshops on "2001, The year of Empowerment of women, Emerging issues" and "Critical areas of concern for

empowering women"; Symposia on "Nutritional profile of Cardiovascular disease patients" and "Bioavailability of iron in mung bean"; Special Lectures (13) on various aspects related to food and nutrition including a special lecture by Dr. C. Gopalan organised in connection with Dr. Rajammal P. Devadas 80th birthday annual oration. In addition, a panel discussion on "Recent concepts of diet in diabetes mellitus" and "Quality matters in early childhood nutrition"; popular and radio talks were also arranged. The chapter has also celebrated special events like World Health Day, World Breast Feeding Week, National Nutrition Week, World Food Day, National Science Day, Dietetic Day and World Consumer Day. A number of film/video shows, exhibitions, demonstrations, quiz/elocution competitions and education camps were also organised.

DHARWAD CHAPTER

The Dharwad Chapter has organized a series of events, during this period, including Workshops on "Enterpreneurial Development in Food Processing", "National Seminar on Environmental pollution and management" and "Enterprenial Development in Food Processing"; Special lectures on "Lactational performance of women deciterium dilution techniques", "Multiple Intelligence and creative thinking", "Recent trends in nutrition research" and "Supplementary Foods"; six panel and thirteen radio talks were also organised. The Chapter has also organized a series of extension activities like World Health Day, World Breast Feeding Week, National Nutrition Week, World Food Day, film/video shows, exhibitions, demonstrations, Quiz/elocution competition and education camps.

GULBARGA CHAPTER

During this week, the Gulbarga Chapter has organized three special lectures on "Nutrition for school children", "Balanced Diet" and "Nutrition for officers". The Chapter has also conducted several extension activities like five popular talks, one radio talk, three exhibitions, demonstration, quiz/elocution competition and observed World Health Day, World Breast Feeding Week, National Nutrition Week, World Food Day and National Science Day.

INDORE CHAPTER

The Indore Chapter has organized a workshop on "Awareness of nutrition to public (different ways)" and a symposium on "Obesity and its complication". Special lectures on "Importance of breast feeding", "Hazards of Hepatitis B and prevention", "Rubella Prevention" and "Nutrition & Infection" were also arranged. Extension activities like popular talks, film/video shows, exhibitions, demonstration, quizlelocution competitions, education camps were conducted in addition to observing the World Health Day, World Breast Feeding Week, National Nutrition Week, World Food Day and National Science Day.

LUDHIANA CHAPTER

During the period, the Chapter had organized a talk on "Menopause Management", Lectures, Nutrition Quiz, demonstrations, and exhibitions on diets for the obese, heart disease and diabetes mellitus. In addition the chapter has celebrated Nutrition Week and World Food Day.

MADHURAI CHAPTER

A Workshop on 'Neonatology", Symposia on "Reterm Nutrition" and "Chronic Diarrhoea", Special Lecture on "Vitamin A in Child Nutrition", Panel discussion on "Breast feeding problems in working women", extension activities like popular talks and radio talks, film/video shows, exhibitions, demonstrations, quiz/elocution competitions and education camps were organized by the Madhurai Chapter during the period. The World Health Day, World Breast Feeding Week, National Nutrition Week, World Food Day and National Science Day were also observed by the Chapter.

MUMBAI CHAPTER

During this period, the Mumbai Chapter has conducted a Workshop on "Dietetics update" a series of lectures, symposium on "Health, nutrition and lifestyle", Special Lectures on "Thalessemia" and "Malnutrition" and a panel discussion on "Fitness for excellence". In addition, extension activities like popular talk, observing World Breast Feeding Day and National Nutrition Week, film/video show and education camps were organised by the Chapter.

MYSORE CHAPTER

The Mysore Chapter has organised a Workshop on "Basic nutrition, food groups and balanced diets"; symposia on "Diet in Diseases", "Food & Nutrition security"; Special lectures on "Breast feeding" & "Ghee: The anhydrous milk fat"; three popular talks; two exhibitions, one demonstration and observed World Breast Feeding Week, National Nutrition Week and World Food Day during the period.

NAGPUR CHAPTER

During the period the Nagpur Chapter has organised Workshops on "Dietary management of AIDS patients", and "Renal Diets" ;Symposia on "diabetic diet", "Lowcost diet", "Role of diet in health disease"; Special lectures on "Importance of therapeutic diets", "Food packages", "Convenient foods" and diet counselling; Panel discussion on "Income generation through skill development to improve the nutritional status". In addition to conducting Popular talk, four film/video shows, five exhibitions, two demonstrations, quiz/elocution competitions and education camps the Chapter has also observed World Health Day, World Breast Feeding Week, National Nutrition Week, World Food Day and National Science Day.

ROHTAK CHAPTER

The Rohtak Chapter has organized demonstrations and education camps during the period.

TRIVENDRUM CHAPTER

During the period the Trivendrum Chapter has organised Scientific activities like CME, Update on paediatric, Nutrition & Gastroenterology. Extension activities like popular talks, radio talks, television talks in addition to observing World Breast Feeding Week, National Nutrition Week, World Food Day were conducted by the Chapter.

OBITUARY

With a deep sense of grief, I announce the sad demise of Prof. V. Ramalingaswamy, Life Member as well as Member of the Executive Committee for a period of 14 years. On behalf of our Society and on my own I behalf, I convey our heartfelt condolences to his family.

NSI is poised to play an important role in prioritising nutrition on all development oriented agendas in the country and improve the nutritional status as well as the overall quality of life of people.

I take this opportunity to express our sincere thanks to all the Executive Committee Members, Local Chapter Conveners and other members of the Society for extending their cooperation in smooth functioning of our Society. My special thanks are due to Founder-President, Dr.C.Gopalan, Present President Dr.B.S.Narasinga Rao, Past-Presidents Dr.S.Varadarajan, Dr.K.T.Achaya, Dr.Rajammal Devadas, Dr.M.S.Swaminathan, Dr. B.N. Tandon, present Vice-Presidents, Dr.Sushma Sharma and Dr.Ramesh V Bhat, Joint Secretary Dr.B.Sivakumar and Treasurer Dr.G.N.V.Brahmam. 1 also express my thanks to Dr. Vinodini Reddy and Dr.Kamala Krishnaswamy, Ex-Officio of the Society for all the help extended by them.

REPORT OF THE TREASURER
FOR THE PERIOD APRIL 2000 TO MARCH 2001

It is my privilege to present the report on the financial status of the Nutrition Society of India for the period Ist April 2000 to 31st March 2001. The opening balance as on Ist April 2000 including Fixed Deposits, Savings Bank Account, Bankers' Cheques and Cash on Hand was Rs.9,14,838-00.

During the year, an amount of Rs. 76,185-00 was received towards Membership fee from 73 Life Members, 147 Ordinary Members and 197 Student Members. An amount of Rs.1,04,245-00 was received towards bank interest on fixed deposits and Rs.8,766-00 on savings bank accounts, Rs.1315/- towards sales of Text Book on Human Nutrition, Rs.625/- towards Sale of Proceedings. An amount of Rs.4,16,325/- was received on account of XXXIII Annual Meeting of the Society held in December last year at Hyderabad. This includes Rs.1,35,025/- on account of registration fee and Rs.21,300/- towards accommodation charges from the delegates, apart from the Grant-In-Aid provided by government agencies and donations received from other private organizations as listed below:

Grant-In-Aid	:	Dept. of Biotechnology	Rs. 30,000-00
		CSIR	Rs. 25,000-00
		ICMR	Rs. 10,000-00
Donations	:	Smithkline Beecham	Rs.1,00,000-00
		Kellogs India	Rs. 50,000-00
		Monsanto	Rs. 25,000-00
		Durga Jewellers	Rs. 20,000-00

During the year, an award for best presentation in Free Communications was initiated under the Title "Ramanathan Award" and a sum of Rs.35,000/- was deposited under this account.

The total expenditure during the period was Rs.8,74,133-00. Out of which, an amount of Rs.5,28,210-00 was incurred on organisation of XXXIII Annual Meeting of the Society held in December 2000 at Hyderabad, and Rs.133,400 towards printing of Proceedings (Volume Nos.46 and 47). An amount of Rs.1,11,723-00 was refunded to the Organising Secretary, XXXII Annual Meeting held at Coimbatore in November 1999. In addition, an advance of Rs.1,00,000 was provided to meet the expenditure of IX Asian Congress of Nutrition to be held at Delhi in 2003. A sum of Rs.800/- was refunded to NIN on account of publications received in the name of the Society.

At the end of the financial year, the closing balance was Rs.6,83,166/-. The Audited Statement of Receipts and Payments of the Society for the year 2000-2001 has been circulated among the Members through the Abstracts Book.

I request all the members to keep us informed about the change of address, if any, so that the newsletters and proceedings are delivered promptly.

I, thank all the Office Bearers and EC Members for the cooperation extended by them during the period.

Sd/- Dr.G.N.V.Brahmam
Treasurer

NUTRITION SOCIETY OF INDIA

National Institute of Nutrition, Jamai-Osmania PO, Hyderabad-500 007

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31st MARCH 2001

Receipts	Rs.	Rs.	Payments	Rs.	Rs.
To Opening Balance			**By XXXIII Annual Meeting Expenses**		
Fixed Deposits	487,159		TA/DA of Delegates	176,716	
Banker Cheques	2,925		Registration Kits	27,620	
SBA/c.No. 5882	363,414		Printing of pre-conf. material	17,777	
SBI A/c.No. 5598	2,805		Awards	14,650	
SBI A/c.No. 5597	55,606		Transport Charges	13,698	
SBH A/ç.No. 4496	2,764		Inaugural Session Expenses	42,473	
Cash on Hand	165	**914,838**	Official Lunch/Dinner	126,718	
To Membership Fee			Accommodation Charges	21,128	
Ordinary	11,125		Printing & Stationery	22,968	
Student	10,030		Postage & Courier Charges	22,298	
Life	55,030	**76,185**	Secretarial Assistance	22,100	
To XXXIII Annual Meeting			Office Maintenance	9,968	
Grant in Aid			Office equipment	6,850	
ICMR	10,000		OT paid to staff	2,160	
DBT	30,000		Bank charges	587	
CSIR	25,000		Misc. (Airport entry fee)	580	**528,210**
Donations			Printing of Proceedings 46 & 47		**133,400**
Smithkline Beecham	100,000		Refund to Org.Sec. 32nd Ann. Meet.		**111,723**
Kellogs India	50,000		Advance to IX Asian Cong. New Delhi		**100,000**
Monsanto	25,000		Cash paid to Director's Office		**800**
Durga Jewellers	20,000		**By Closing Balance**		
Registration Fee	135,025		Fixed Deposits	584,155	
Accommodation	21,300	**416,325**	SBH A/c.4496	2,875	
Sale of Text Book on Human Nut.		**1,315**	SBI A/c.5598	2,929	
Sale of Proceedings		625	SBI Alc.5597	4,712	
Interest received			SBH A/c.5582	83,153	
Prudential Bank 17476/74477	32,332		Cash on hand	5,342	**683,166**
17477/74498	32,332				
24937	32,332				
SBH, Lalfaguda 0305792	3,616				
0305793	**3,633**	**104,245**			
SB A/c. **SBI 5597**	1,182				
SBI 5598	?!				
SBH 4496	111				
SBH 5582	**7,349**	**8,766**			
	Total	**1,557,299**		**Total**	**1,557,299**

Place: Secunderabad
Date: 20-09-2001

for HARI BABU & ASSOCIATES, Chartered Accountants
Sd/- (CH. Hari Babu, Partner)

Sdl- (GNV Brahmam)
Treasurer, NSI, Hyderabad-500 007

Sd/- (B.Sivakumar)
Jt. Secretary, NSI, Hyderabad-500007

Sd/- (Ramesh V Bhat)
Vice-President, NSI, Hyderabad-500 007

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